# Textile World

ESTABLISHED 1868


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February 28, 1933

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Textile World

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# *Textile Profits: A Ghost from the Past*

WE have dug up an old museum-piece as the theme for this Annual Number. By talking with some of the old inhabitants, and by means of a certain amount of historical research, we have brought back to life one of the glories of years gone by: Textile Profits.

It seems, according to the stories we have read and heard, that such things did exist, once. In fact, the industry had its crop of "barons," we learn. It piled up surpluses; traces of these may be found today in the vaults of some of the companies still doing business, or rather philanthropy.

We had a bright idea. Some of our readers might want to try to reproduce these antiques.

Of course, there is a belief prevalent today that those old textile fortunes sort of grew by themselves; that all one had to do in the good old days was to make goods and take in the profits; and that those days have gone forever. . . . We wonder.

▼

From what we can learn, there was a little trouble involved. In fact, after reading of past depressions, of floods of foreign goods, of cut-throat competition, of labor troubles, and of bankruptcies, we are almost convinced that history is merely repeating itself. The textile builders of the past may not have had the same set of facts to face that we have today, but they had equally trying ones. And, since the industry is still here—with its dwindling surpluses and all—we gather that the manufacturers faced those facts.

They faced them, not with the same methods their fathers and grandfathers had used, but with the same courage.

For a while, in the last decade, courage seemed to have gone the way of profits. But, we believe, it is once again being injected into textile manufacture. That is why we are talking about profits in this issue; otherwise we would not have wasted a lot of gold ink on the cover.

▼

The ways in which a man can make money, even though engaged in textile manufacture, fall into relatively few categories. For the purposes of this number, we have classified them as: Management, Merchandising, Methods, and Modernization. Nor do the rules of the game seem unduly stiff. After going over the material just before press-time, we came to the conclusion that textile profits are a possibility.

There is one reservation. A man can modernize his plant, his selling, his management policies, and his manufacturing methods—and yet give it all away in his price. We have no remedy to suggest for this peculiar disease.

But, to those who are really interested in re-creating textile profits, we offer the contents of this year's "Annual" as a guide.

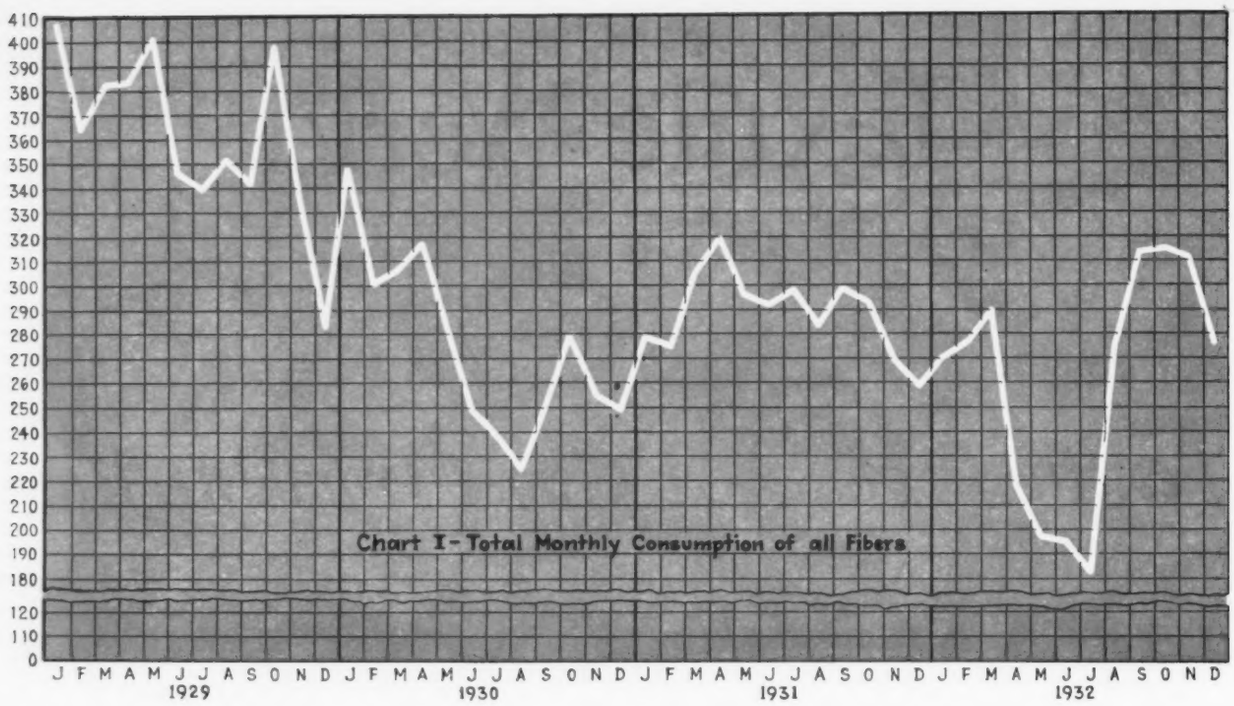



*CHART I—TREND OF GENERAL TEXTILE ACTIVITY*

*Based on total monthly consumption of raw material, charted directly, in hundreds of thousands of pounds. Relative trend of individual fibers is shown in Chart II.*

# *Roller-Coaster Year*

## OF 1932 LEAVES TEXTILE INDUSTRY BREATHLESS BUT HARDENED

*By Douglas G. Woolf*
*Editor,* TEXTILE WORLD

THE textile industry took a ride on a roller-coaster in 1932—and not on one of those sweetly scenic railways of yester-year which thrilled the Victorians but on one of the "mile-high chaser" type which, whether they admit it or not, really do thrill the youth of today. That, of course, explains the breathless feeling one has as the late-lamented twelve months pass in review. Those who have tried this latest form of "amusement" will recognize the sensation as quite similar to the one experienced as the car comes to a standstill and the rider gets out uncertainly, wanders around a bit, looks up at the monster, and wonders if he himself had actually cavorted on it.

We now give the reader an opportunity of looking back at the roller-coaster on which he rode last year. Chart I tells the story. Those inclined to dizziness are urged not to study it too closely. Said chart portrays the trend of textile mill activity since things started to happen back in 1929.

Concentrate, for the moment, on 1932. Recall the sinking feeling in the pit of your stomach during the drop in the period from April to July—and then experience again that amazing vertical climb from July to September. The textile industry, in some time in the past, may have explored lower depths than those of last July; it may have shot upward more precipitately than it did during the next two months—but our own modest researches fail to uncover either such occurrence.

Is it any wonder, then, that textiles became front-page news last fall? Was not the publicity warranted? The contrast between so-called capacity operations in textile mills and 13% activity in steel mills was too great to escape attention. Of course, there were other factors in the picture—but we shall come to those later.

The pick-up in the last months of the year enabled the industry to close 1932 with a total rate of operations only 10% below 1931—and 16% below the 1923–1925 average which many of our best economists, we understand,

use as a "normal" year. In the TEXTILE WORLD Analyst, we have been using the eight-year average, 1924-1931, as something approximating a "normal" year under present conditions; on this base, 1932 was 19% below "normal." The difference between the two bases, it will be seen, is slight.

To be orthodox, we have plotted the consumption and price trends of cotton, wool and silk during the last decade on the 1923–1925 base. Chart II shows consumption; Chart III shows price. (Rayon, the young upstart, had to be left out of this picture; the page isn't big enough to hold its consumption curve in relation to those of its elders.)

Since index numbers are used, and since these two charts are in scale, the three fibers can be compared accurately. Any number of interesting deductions can be drawn; we shall try to hold our imagination within bounds.

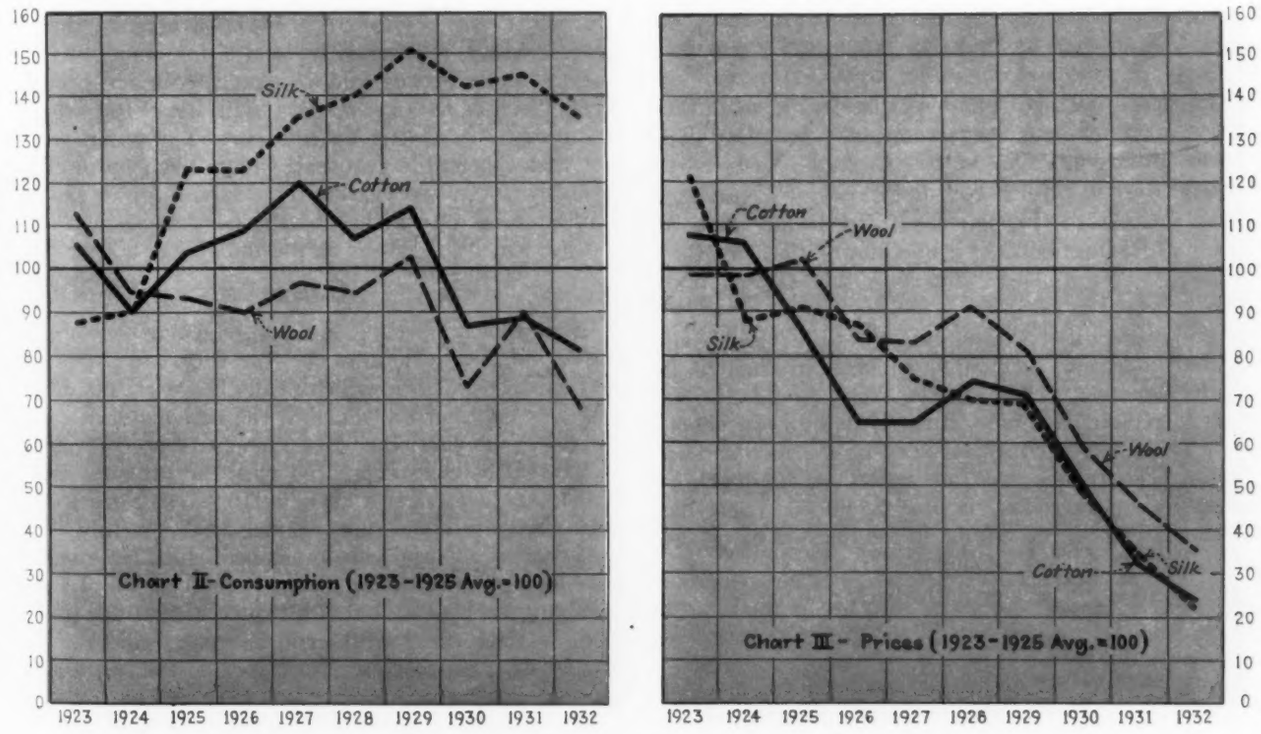
The first broad impression one gets is the remarkable stability in volume of consumption as compared with the collapse in price. This, probably, is no news to our readers.

Taking up the fibers individually, the behavior of silk is particularly striking. Its percentage consumption curve is entirely out of line with those of cotton and wool. Starting as the lowliest of the trio in 1923, it now looks down upon the other two from the heights. Wool, on the other hand, began the decade at the top and ended it at the bottom. Cotton maintained its middle ground. Thus, silk's peak during the ten years was an annual consumption 51% above the 1923-25 base (in 1929); cotton's peak was 20% above the base (in 1927); and wool never exceeded its peak of 13% above "normal" with which it started the cycle. On the other hand, wool was at a low point of 32% below the 1923-25 average consumption in 1932; cotton also reached its low for the decade last year, being 19% below the base; but silk was still 35% above.

We turn "eyes right" to the price chart reluctantly. At a quick glance, it looks as if there is little to choose among the three fibers. They all seem to have one idea: to go down hill as quickly as possible. On closer scrutiny, however, it will be noted that wool, whose consumption suffered most during the period, declined in price less, on a percentage basis, than did the other two. Silk, the consumption king, hit a slightly lower "low" than did its nearest competitor, cotton. We doubt if it it wise to pursue this thought further; there are too many "ifs" and "buts" involved. We merely mention it in passing because the chart told us so.

## *What's Ahead in Textiles?*

It is good textile practice to deprecate the newspaper publicity which last year's come-back earned. Our own conscience has impelled us to follow that practice—because we happen to maintain a series of tables showing




*CHARTS II AND III—ACTIVITY AND PRICE TREND OF LAST DECADE*

*Chart II, at left, and Chart III, at right, show activity and price trends, respectively, in cotton, wool and silk from 1923 to 1932, inclusive. Rayon, which enjoyed its major production rise during the period, is not included as it is out of all proportion to the three older fibers. Both charts are plotted from index numbers, with the average of the three years 1923-25 as the base, 100. In other words, the curves show, for each year, the relationship of the fiber's behavior in that year to the base period. Chart II is based on yearly consumption of the fibers; Chart III on* TEXTILE WORLD'S *price index numbers.* [*As an example of the significance of the charts, Chart II shows that in 1923 wool consumption was 13% above the 1923-25 average, cotton 6% above, and silk 12% below; Chart III shows that the relative declines in cotton and silk for the last four years have closely paralleled each other, assuming that the 1923-25 average represents par between the fibers.*]

manufacturing margins, or profit possibilities, which tell another story. But we wonder if this modesty hasn't been a bit over-done.

In the first place, the textile industry was enabled to contribute far more, proportionately, to the abatement of unemployment last year than was probably any other industry. In the second place, the doubt—and it was a real one—that textiles were ever going to be bought any more, was removed. In the third place, manufacturers on the whole displayed, during the "boom" of last fall, a resistance to the temptation to run wild on production which augurs well for the future. Finally, we consider it quite possible that 1932 marked a real turning-point in the affairs of the industry.

We make the latter statement with all due realization of the disrepute into which such prophecies have fallen, but with a firm conviction which forces us to brave the scorn of those who are "fed up" with hopeful comment in an apparently hopeless era.

Of course, we start with the premise that the world, and this country, are still going on—and with approximately the same economic machine that got so badly out of gear recently. (It is a little less unpopular to say this today than it was a month or two ago, before the technocrats started eating each other up.) We know there will have to be many repairs made on it—and we hope the mechanics do a thorough job, rather than just try to patch it up. But, for all practical purposes and for such part of the future as we care to worry about just now, the prevailing system may be regarded as stable. (We are not arguing that point; we are merely stating it.)

On this basis, we are confident that textile manufacturers are in a lot better shape to make progress than they were three years ago, or ten years ago.

If there were no other considerations, just the fact that they *have* lived through the roller-coaster ride of 1932 and preceding years is something. Possibly they have become a bit blasé but they also have been hardened.

But there *are* other considerations. We have mentioned one: the new inclination to keep production in line with demand. Then, there is the liquidation of equipment, which has gone further than most people realize. There has been a discovery of the merchandising factor. There has been an aggressive approach to the consumer's pocketbook via new products. There has been a slow advance in thinking, in the matters of wages, hours and other related problems.

But, of course, the heckler in the back row has to bring up "price." We thought this was a gentlemanly gathering.

Yes, we have heard about the price policy—or lack of price policy—in the textile industry. We have even mentioned it in one or two little pieces we've written for the papers.

It's not so good, is it?

Even on this point, however, we are not despairing. Thinking about it the other night, we realized that textile men seem to think they have a corner on price-folly. As a matter of fact, it has been a national pastime. No matter whom we talk with—or what industry he represents—we hear the same story. This fact does not mitigate the effect of such folly upon the textile industry. It does, however, help to explain its existence. More important still, it is a hopeful thought because it indicates that textile men were infected by a national epidemic rather than displaying some cancerous growth peculiar to their own industry.

**Ten Years of Cotton Textiles: A Fact or Two from Survey of Association of Cotton Textile Merchants of New York**

| | Production (000 Sq.yd.) | Per Capita Consumption (Sq.yd.) |
|---|---|---|
| 1923 | 8,264,219 | 71.89 |
| 1924 | 6,662,808 | 56.22 |
| 1925 | 7,741,568 | 63.62 |
| 1926 | 7,936,942 | 64.25 |
| 1927 | 8,980,415 | 71.73 |
| 1928 | 7,972,551 | 62.50 |
| 1929 | 8,541,546 | 66.14 |
| 1930 | 6,558,154 | 50.14 |
| 1931 | 7,140,653 | 54.88 |
| 1932 | 6,445,342 | 48.86 |

Nor has there been no attempt to fight the disease. We recall, with pride, such instances as the Aberfoyle action last June, and the finishers' arbitrary price-advances late in the year. Isolated cases, it is true, but enough to hearten this observer, at least.

For 1933, we see fairly well-maintained volume of textile demand, with possibly slight gain in total activity over 1932—say 7½ to 10%. We have made this rash statement before; the year is still too young for anyone to contradict us and if next December proves us wrong, we hope our readers will have forgotten.

But right or wrong on this particular point, we predict that the textile future promises even more change, probably more worry, but certainly more opportunity than have been furnished by the last textile decade.

Now for a quick look at the individual fibers:

## *Cotton*

In addition to sharing in the spectacular pick-up in the textile industry generally, the cotton division staged two performances in 1932 which made the year a notable one. One was the sharp advance in the raw material price in August following the Government crop estimate of 11,306,000 bales as compared with the previous crop of 17,096,000 bales. Average price for New York spot cotton in August was 7.40c. against 5.80c. in July. Later Government reports were more bearish—December estimate being 12,727,000 bales, an increase of 1,400,000 over August (but still radically lower than the previous crop, in fact the lowest crop in nine years.) Prices reacted of course; New York spot at the beginning of the year was 6.10c.

The world supply of American cotton for 1932-33 is now estimated by the Department of Agriculture at 25,700,000 bales which is only 300,000 bales less than the record supply of 1931-32 and is 2,200,000 bales greater than the large supply of 1926-27.

Consumption of cotton in the United States last year was only 8% less than 1931—a remarkable showing when the stagnation in the middle of the year is recalled.

The other outstanding cotton performance of the year was the control maintained over mill production in relation to demand. Sales of cotton goods in 1932 were 4.8% over production; shipments were 2.7% in excess of output. As a result, stocks declined 26.1% during the year to the lowest end-of-year supply on record.

Unfilled orders increased 18% to the highest December figure since 1929.

These figures speak for themselves.

## *Wool*

It was a tough year in the wool industry.

A prominent worsted manufacturer told us last June that he had made a sample census of the mills in May and had estimated that they were operating at only 5% of capacity. We smiled politely, but thought the statement slightly exaggerated. Later statistics, however, showed that evidently a considerable number of the mills must have been completely paralyzed. Wool consumption in May was only 16,519,000 lb. against 44,966,000 in May, 1931; 32,641,000 in May, 1930, and 48,765,000 in May, 1929.

Things couldn't go along like that forever, of course. The worm turned slightly in June and July, and convulsively in August. September was the high month of the year, with 46,055,000 lb.—nearly three times the consumption of May. But the damage had been done and the total for the year was 25% below 1931. Incidentally, imports of wool in 1932 were 64% below those of 1931 and were the lowest since 1894, according to the Department of Commerce. Despite this unhappy picture, the raw material situation has been relatively strong. In fact, talk has been heard of a threatened scarcity, but authorities do not take this too literally. Preliminary estimates of the Department of Agriculture place 1932 total wool production in 19 countries at 2,793,000,000 lb., a decrease of only 14,000,000 lb. from the record clip of 1931.

The prospects are for a decidedly better wool year in 1933. . . . . The industry can use one.

## *Silk*

Despite the doleful remarks heard recently, silk consumption last year was only 7% below 1931.

There is apt to be a confusion of meaning in any discussion of the "silk" industry. It is true that the "broadsilk" mill is now as much concerned with synthetics as with silk. But, as we have said previously in these columns, the manufacturer himself is not particularly concerned as to whether he makes money—or tries to make money—out of processing silk, or rayon, or both. Consequently, we can't see any "crisis" in the "silk" industry, even if the name is not adequately descriptive. Meanwhile, from the raw-silk dealer's standpoint, hosiery mills chew up large quantities of the product—and may be expected to continue to do so.

The raw material situation, however, is not a sound one. Prices crumbled last spring to new lows; they recovered somewhat in the later months but the outlook is still unstable. The participation of the Japanese Government is the principal problem involved. But this is an old story.

**Estimated Production and Consumption of Rayon Yarn—1932**
**(in thousands of lbs.)**

| | Production | Consumption |
|---|---|---|
| **Belgium** | 9,545 | 5,930 |
| **Britain** | 72,530 | 63,400 |
| **Canada** | 7,145 | 8,350 |
| **France** | 39,670 | 22,500 |
| **Germany** | 54,640 | 67,000 |
| **Holland** | 16,545 | 3,000 |
| **Italy** | 71,875 | 25,700 |
| **Japan** | 66,320 | 56,600 |
| **Switzerland** | 11,650 | 5,750 |
| **United States** | 131,000 | 149,500 |
| **Others** | 17,450 | 95,000 |
| ***Total*** | 498,370 | 502,730 |

## *Rayon*

Even if left out of our chart, rayon has been very much in the picture. Statistics compiled for the industry by one of its members, and printed in the last issue of this publication, showed a domestic synthetic fiber production of 131,000,000 lb. in 1932, only 10% below the record total of 1931. Consumption totaled 149,500,000 lb., against 151,000,000 lb. in 1931. The frantic rush for yarn last fall is too well-known to warrant re-telling.

Our Manchester (Eng.) correspondent has compiled his usual estimate of world rayon production and consumption. (Table below.) The total production of 498,370,000 lb. compares with the revised estimate of 480,000,000 lb. in 1931—an increase of about 4%. Let's see—someone estimated the 1914 world "artificial silk" production at 26,000,000 lb. How the child has grown!

Commenting on the situation, our correspondent says:

"In the first half of the year the outstanding features were the lower total of American production and the big increase in British production. The final British figures are not yet available, but the total at around 72,000,000 lb. is smaller than was at one time expected and in our preliminary estimate we gave Britain's production at 74,700,000 lb. Even this later estimate makes Britain the second largest producer as there has been a decline in Italian production owing to the difficulties in the export markets. The estimate we now publish for Italy is 5,000,000 to 6,000,000 lb. lower than the estimate published in September. Japanese output on the other hand has continued to increase and the figure now quoted is approaching 5,000,000 lb. larger than anticipated earlier in the year.

"The marked improvement in the German market during the second half of the year has resulted in an increased output and the latest estimate is 3,500,000 lb. up on the preliminary figure. French production was also underestimated earlier in the year, and with greater rationalization the tendency has been for the smaller countries to increase their output.

"The bulk of the increase in production has been in viscose rayon and the percentage totals for acetate and cuprammonium remain relatively stable. Nitro-cellulose is entirely in the hands of one American producer.

"It is interesting to note that compared with the preliminary estimate last September, consumption is up by 19,000,000 lb. as compared with 15,000,000 lb. in the case of production. The showing in United States consumption is a very healthy sign as an appreciable reduction in stocks must have occurred during the year. Compared with the preliminary estimate, consumption in United States, France, Germany and Japan show the most encouraging improvement. The increase in the total is entirely due to improvement in yarn-producing countries as the figure for other countries, which includes only the smaller producing nations, and is mainly the big non-producing countries of the world, is smaller. In every country the tendency is for rayon to increase in importance and we can look forward to 1933 with confidence."

## I—Money-Making Management

***Every article in this issue affects management. However, in addition to specific problems of merchandising, mill methods, and modernization, there are such cross-sectional phases as creation of new products through research, budgeting of production, managerial aspects of employer-employee relationships, development of standards, and participation in industry-wide movements. These policies are considered in the succeeding pages.***

# *New Products*

## PAY DIVIDENDS ON TEXTILE RESEARCH

NON-RUN hosiery, crease-resistant cotton and rayon piece goods, floor coverings fabricated without a loom—these are but a few of the new products which have resulted from textile research. In the last two or three years many mills have found that technical research directed towards the development of new products is money-making research. This has proved true also of market research to find new uses for older products. Let us then look at some of the more recent research developments from which the textile industry has profited.

Utilization of rubber, and more particularly latex compounds, by the textile manufacturer and finisher has given rise to a host of new products. Typical of these are the "seemingly seamless" rug of Collins & Aikman Corp.; the non-woven floor-covering developed by Lea Fabrics, Inc.; "Lastex"—the yarn-covered, latex-core thread—produced by U. S. Rubber Co.; and "Doe-Tex," a suede-like fabric brought out by DuPont. Latex compounds have made it possible for the textile mills to manufacture a new type of artificial leather, rug underlays using terry cloth as a base, double-texture fabrics, and similar products hitherto beyond their scope.

Lastex, itself derived from latex, has in turn engendered the garterless sock, semi-sheer elastic fabrics employed in garments, and "two-way stretch" bathing suits. Hosiery mills, thanks to research, have conferred a boon on the American housewife and business woman by giving her run-resistant hosiery in either full-fashioned or circular styles, to fit her taste and pocketbook. Synthetic furs—not those of the cheap imitation type, but striking pile fabrics which can stand on their own merits—are now being woven. Broadtail is being reproduced with mohair; caracul, galyak, colt, antelope—even ermine—from rayon and acetate yarns.

Research has played a leading part in bringing the American-Oriental rug to its present stage of refinement. Starting from scratch, the carpet manufacturer made investigations to determine the most suitable grade of raw stock, worked out washing methods which would not damage the wool, discovered dyestuffs which would withstand the chemical treatment to which the rugs are subjected, developed looms to give the weaves required.

Development of cotton fabrics suitable for hooked-rug foundations is the result of research carried out by the U. S. Department of Agriculture with the aid of the Textile School of North Carolina State College. Football pants of silk, wool neckties and sport shirts, spun-silk underwear for men are a few of the new products which recently have been placed on the market. Waterproofed beach pajamas of the oilskin type have appeared this winter at Southern resorts. Among the new products which have resulted from market analysis and development research at the Russell Mfg. Co. are elastic webbing for pajama tops, a garter of unique construction, a new type of brake lining, and an improved belting. Blankets with a silk warp and wool filling—said to give maximum warmth with minimum weight—were brought out last year by Nashua Mfg. Co. There is no bow to tie or untie, no loose lace to trip on, when one uses the cotton-covered elastic shoe lace now available.

### *Crease-Resistant Fabrics*

Fabric finishers have been most active in developing new processes which so modify the characteristics of the fabric as to create what are virtually new textiles. Crease-resistant cotton and rayon piece goods—the result of intensive research by Tootal, Broadhurst, & Lee, of England, and soon to be made in this country—are outstanding example. A cotton fabric with wool-like appearance and handle, which Bellman Brook Bleachery recently announced, is another. Sanforizing, a research development of Cluett, Peabody & Co., enables the production of "zero-shrunk" cotton goods. Cotton felts and other fabrics, so treated as to absorb hydrogen sulphide, have been placed on the market recently. The fabrics are then made into bags or cases which prevent tarnishing of silverware placed therein. A new coated fabric, brought out some two years ago, found immediate use for making soil-proof table cloths and more recently has

been utilized in the manufacture of water-proof shower-bath curtains. Resistant to water, air, acids, alkalis and organic solvents, "Endurette," a new type of water-proofed silk announced last year, has already been employed for making a diversity of products, including raincoats, sun suits, windows for greenhouses and gas masks.

Metallized fabrics, formed by spraying molten metal on the goods, now somewhat of a novelty, are expected to find increasing use in wearing apparel, home furnishing, and mechanical fields.

## *Rayon Industry*

Children of research, the synthetic fibers—from Chardonnet "silk" to the lusty newcomer, Furness cuprammonium yarn—attest the potency of their parent. Thus a major industry, last year producing in this country alone over 130 million pounds of rayon and giving employment to many thousands of workers, is attributable to research. Coincident with the rapid growth of the rayon industry, have come many new products—both woven and knitted—made from the synthetic yarns. A few of the newer developments include rayon golf-shoes; Turkish towels, wash cloths, and sponges; Fabrikoid synthetic yarn suitcases; even synthetic cobwebs.

Not all textile research is carried out by the textile mills. "Super-twist" tire cord, developed in the laboratories of the Goodyear Tire & Rubber Co., is typical of the new products which have resulted from research in those industries which are large consumers of textiles. Discarding the traditional procedure of manufacturing yarns and cords of the maximum tensile strength, Goodyear engineers developed a highly twisted cord of lesser strength, but of greater elasticity and hardness—a cord, proved by actual road tests, to be from 60 to over 100% more durable than if made the usual way.

Since the earliest days of electrical engineering, textiles in various forms have been used for insulating purposes. Recent researches conducted by the electrical industry have resulted in new products far superior to those formerly available. Typical of these are the cotton and spun-silk yarns for electrical insulation, developed by Western Electric Co. These are yarns which, treated by a special purifying process, have an insulation resistance 200 to 350 times greater than normal yarn.

New products are in the air. Research to find a strong, light, textile material, easily fabricated to any desired shape, and impervious to gases, has resulted in a new type of balloon cloth. This consists of two very light cotton fabrics vulcanized together with a thin ply of rubber within, the two layers of cloth being so placed that the yarns in one fabric are at an angle of 45 with those of the other. Cotton wing-fabric for airplanes was the forerunner of the newer glider fabric, an extremely light, high-count material, weighing 2 oz. or less to the square yard, woven from mercerized yarn made from high-grade Sea Island or Sakelaridis cotton. Parachutes of a domestic cotton fabric, developed by the U. S. Bureau of Standards in cooperation with the National Advisory Committee for Aeronautics, have proved in tests by the Navy Department to be equal to those of silk in strength and tear resistance, and to approach closely the performance of silk parachutes as to rate of descent, opening time, and ability to function when stored in packs for 60 days.

Another new mechanical fabric is a filter cloth, made of spun nitrocellulose, and suitable for filtering strong acids. Also new are molded and laminated products in which cotton fabrics are being used in conjunction with synthetic resins to produce gears, truck wheels, airplane propellers, etc. Research is now being conducted to produce a light fabric of domestic manufacture which will be completely impervious to poisonous gases.

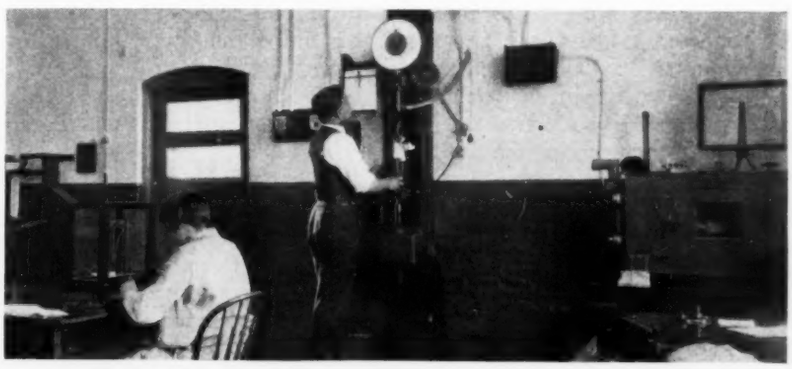
Marketing research has led to the discovery of numerous new uses for textiles and in many cases has paved the way for the development of new or modified forms. The Cotton-Textile Institute, through its New Uses Section, has been exceedingly alert to seize upon and capitalize every possible new use for cotton. Some of the diverse ways in which cotton cloth has been utilized are as a binder in road construction, as lane markings for highways, for constructing chicken houses over a wooden framework, as a wall covering, either alone or in conjunction with wood veneer. Popularizing of men's hats of cotton braid, stationery of cotton, and cotton posters for advertising purposes has created new outlets for the textile manufacturer. Development of a strong, low-priced cotton bagging fabric makes it possible to ship cotton bales in cotton wrapping.

A triumph of merchandising research is that of the American Felt Co. Long established in the industrial and utilitarian markets, this firm decided to sell felt fabrics to the apparel and accessory industries. The market was investigated, consumer needs were studied, a stock of the highest-grade fine staple wool was purchased, special equipment to produce finer felt fabrics was installed. Jump a few months and we see a new apparel vogue—felt jackets, gloves, bags, belts, scarfs, trimmings; women garbed in felt from hat to shoes.

Textiles are in the radio industry, the latest entrant being a cotton fabric, developed, strangely perhaps, by the American Woolen Co., and designed to improve the acoustics of broadcasting studios.

No attempt has been made to cite all of the new textile products and new uses for textiles which have been developed through research. It is believed, however, that sufficient examples have been given to show that research, while no panacea for the ills of the textile industry, is an effective tonic for those mills which are suffering from declining sales and profits.

No one doubts that there is room still for the development of new and better textiles. Some of these may be fabrics radically different from any which are manufactured at present; others modifications or adaptations of products now available. Where research will lead depends only on the imagination, ingenuity, and resourcefulness of the men in the industry.



# *Budgeting Production*

## EFFECTS MATERIAL

◆ *Last October Mr. Hood, in accepting the presidency of the N.A.C.M., made brief reference to the possibilities in budgeting of production. Since it has been our opinion for some years that an intelligent effort, on the part of textile manufacturers, to spread their production schedules more evenly over the 52 weeks of the year, we asked Mr. Hood to expand his thoughts on this subject.*—Editor.

*Part of plant of Pequot*

BUDGETING of production, which has been adopted by an increasing number of cotton mills during the last few years, has in many cases proven to be advantageous from the standpoint of the mill, the employees and the community in which the plant is located. Although far from being a cure-all it nevertheless helps to curb the menace of over-production.

Up until about 1921 sales were limited by the amount of equipment available and with a steadily expanding market the demand, except for minor fluctuations, was always in balance or in excess of supply.

There was no problem of over-production, except in the recurring periods of depression, and the custom prevailed that each mill operated to capacity throughout the year and disposed of its product with little difficulty.

Now, however, conditions are quite different. For a number of years there has existed a large over-capacity to produce. Whenever it appears that a mill is making money on a product, ultimately a sufficient number of mills enter that field so that from a condition of practically balanced production there becomes a potential if not actual over-production.

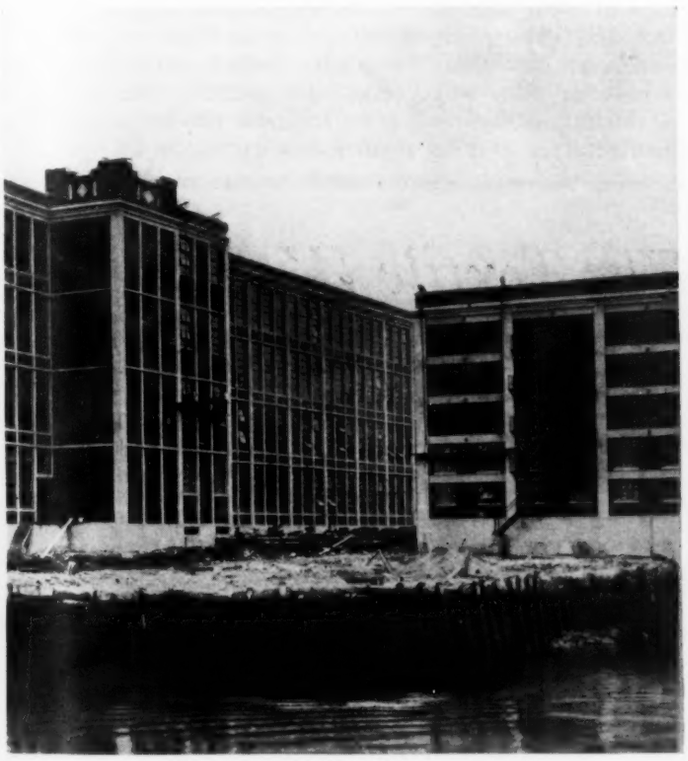
Usually the new-comers in the field, in their efforts to get a share in the business, immediately tend to demoralize the market. Almost invariably they use the bait of lower prices rather than an effort to better the product or the merchandising. The thought seems to be that if they can get their share of the market they can later increase prices. Unfortunately, this never works out as the older mills in the field, in order to meet the new competition, are compelled to reduce prices.

The new-comer in a trademarked field is also aided by the disposition on the part of a number of retail stores to carry a product under their own name or, at any rate, a less well-known name than the standard brands. The price of the standard brands is quite generally known among the customers and the store finds it difficult to mark up these brands as much as its own or the less known brand.

Particular impetus was given to expanding the wide sheeting industry during the war because so many of the wide looms were required for military purposes that the supply of sheets on the market was very greatly reduced. In consequence sheetings were high in price. Many manufacturers who were looking for some field more profitable than the one they were in seized upon this situation. Not all of the new-comers survived and not all of the original sheet manufacturers weathered the storm. However, there still remains a sufficient number of mills to more than supply the domestic requirements.

***By Ernest N. Hood***
*President, National Association of Cotton Manufacturers; Treasurer, Pequot Mills*

# SAVINGS IN COSTS



*Mills at Salem, Mass.*

This has led to the need for control of production and in this particular field, at least, it appears to me that budgeting of production can be made most effective.

Material savings in costs can be obtained through an intelligent budgeting of production. More steady operation is found to be more economical than the start and stop system. It is, of course, greatly to the advantage of the employees, and with some assurance of more continuous employment for these people the community benefits from the comparatively steady payroll provided.

For that part of the industry which does not find it practicable to adopt a budgetary system of control of production the Cotton-Textile Institute has recommended a course of running a reduced number of hours, which helps to control output.

Budgeting production, of course, is exactly opposite in theory to the policy adopted by some mills of operating on orders only and keeping inventory stocks of raw material and finished goods at a minimum. Any wide fluctuation in prices naturally causes more loss or more profit to the mill budgeting its production. In other words I freely point out that the system has its disadvantages as well as its advantages. There are dangers to be encountered but the system has its compensating benefits.

Budgeting production is briefly a matter of analyzing sales, of following general business trends and of making use of information as to probable requirements received through the selling house as the result of a survey of the various outlets. It provides a guide which can ordinarily be relied upon. There is really nothing new in the idea because certain lines of goods—for instance, seasonal goods like blankets—have always been run more or less on budgeted production. The budget is an extremely desirable thing and one in which different mills must make their own interpretation as to how it is to work out. I realize that some mills produce lines of goods so affected by style that they must take orders when they can get them. Yet even in such mills it may be that something can be done at least to improve a situation where there are periods of either intense activity or of flat shutdown.

Pequot Mills, being manufacturers of but one product, sheets and pillow cases, for which there is a steady demand, find it less difficult to budget their production than do mills which manufacture a diversified line, especially the fine goods mills where the element of style is all-important and constantly changing. The five-year record quoted above shows what can be done in a staple goods mill.

*WHAT CAN BE DONE in budgeting production by a staple goods mill can be seen from the following five-year record of production and sales at Pequot's Salem plant, which shows a difference of only about 6,000 yd. between total sales and total production:**

| | Production | Sales |
|---|---|---|
| 1932 | 18,240,630 yd. | 18,466,223 yd. |
| 1931 | 19,601,887 " | 19,460,503 " |
| 1930 | 20,086,821 " | 20,335,881 " |
| 1929 | 20,836,475 " | 21,058,163 " |
| 1928 | 20,945,905 " | 20,397,142 " |
| | 99,711,718 " | 99,717,912 " |

**Editor's Note: Another interesting deduction to be drawn from this five-year record, in our opinion, is the relatively narrow annual fluctuation over the period. The output in the peak year was less than 15% in excess of the low; also, the last three years were remarkably close together, despite difficult business conditions. It would seem that, in the case of this company at least, the uniform budgeting of the bulk of the output presents no insurmountable problem.*

# *Wages and Hours...*

## VITAL FACTORS IN PROFIT PICTURE

WHEN both the outgoing and incoming presidents of the National Association of Cotton Manufacturers declare that textile wages are too low, when a group of Alabama mill men advocate a national 48-hour law, and when a number of textile executives testify in Washington on the Black 30-hour law, it is obvious that the questions of wages and of hours are of vital concern to the industry.

In the isolated instances mentioned above, arguments were predicated on facts rather than on any such a vague phrase as "social welfare," and the same line of approach is apparent in all other movements. This does not mean, of course, that textile manufacturers are not greatly concerned with the social aspects of the case, but rather that they have preferred to present their views on the basis of what present conditions mean in the dollars and cents of the balance sheet.

In view of the decided importance which leaders in the industry place upon the trends in wages and in hours, it is impossible to ignore these factors and their bearing on the profits that the average mill may expect.

Without going into specific operations in a specific branch of the industry, it is difficult to make any quantitative statement on the amount that textile wages were reduced during 1932. Probably the best general indication of the trend, however, can be secured by taking the percentage of decline in wages for what might be called an average job in each of the major divisions of the industry, and then weighting these percentages in accordance with the number of wage earners employed. On such a basis, the industry-wide wage reduction amounted to about 18%. Such a figure is not applicable, of course, to any one job or to any one division of the industry.

The general tendency was to reduce the higher-paid workers more than those receiving small pay-envelopes. This also shows up when divisions of the industry are examined; some classes of knitters, for example, being cut far more than cotton-mill spinners.

### *The Wage "Chiseler"*

So far as the attitude of individual mills is concerned, the number of those which took advantage of conditions to "chisel" wages is more than balanced in numbers by those that kept wages as high as possible. The question of wage "chiseling," however, has a direct bearing on the profits of the average mill. Reflecting the views of many other executives, Granville A. Beals of the Greenwich Mills pointed out, in an article that appeared in the January issue of TEXTILE WORLD, that even a relatively small number of low-wage units could affect the market prices at which the majority must sell.

The same point of view was expressed by Ernest N. Hood, treasurer of the Pequot Mills and president of the N.A.C.M., when he stated:

"I know many cotton mill treasurers who are now paying lower wages than they would like to do. I know many of them who did not cut wages until wage reductions and consequent cut-throat competition in other sections of the industry compelled them to reduce costs by lowering their wage scale. The pathetic feature of the situation is that there are a sufficient number of such manufacturers to bring about ruinous prices in the market. Buyers will purchase goods at the lowest prices; nothing else can be expected of them."

Up to the present there has been no definite, widespread movement to combat the wage "chiselers.' There has been a great deal of discussion, however, and individual action in some cases, and it may well be that 1933 will see a concerted effort to combat a practice that has such an important bearing on the profits of the industry.

### *Wages Believed at Rock Bottom*

Those who believe in higher wages can at least receive negative encouragement from the course of reductions during the year 1932. Analysis shows that reductions during the first six months of the year were more than double those occurring in the last six months. The present attitude is that wages are at rock bottom and that any change must be for the better. As compared with the previous year, there was relatively little discussion in 1932 on whether wages should be higher or lower. The feeling was general that, so far as textile wages were concerned, individual adjustment might be necessary in some cases but the industry-wide level had certainly been sufficiently liquidated. Many observers pointed out that the mills cannot hope for profitable operation unless the workers in textile and other lines receive a wage suffi-

## *The Textile Wage:*

**During 1932, leaders had the following to say about wages and hours in the textile industry:**

**▶ IRVING SOUTHWORTH: "The present wage scale in the textile industry is too low; it benefits no one—employer, employee, or buyer." *(From address as retiring president of National Association of Cotton Manufacturers.)***

**▶ ERNEST N. HOOD: "I know many New England cotton mill treasurers who are now paying lower wages than they would like to. I know many of them who did**

cient to allow the purchase of more than the barest necessities.

Two items taken from outside sources are of interest. The first is a statement of the National City Bank: "There is great popular sentiment against any proposal to reduce wages, and wage rates therefore have a high degree of rigidity." The second is a selection from wage data compiled by the National Industrial Conference Board. Textile indices are as follows:

| | Base 1914 | Year 1929 | July 1932 |
|---|---|---|---|
| Cotton (Northern Mills) | 100 | 235 | 195 |
| Hosiery and Knit Goods | 100 | 277 | 196 |
| Silk | 100 | 245 | 192 |
| Wool | 100 | 266 | 198 |

## *Agitation for Shorter Hours*

Quite outside the pros and cons of the particular proposal, the number of textile executives advocating a national 48-hour law increased markedly during the last year. The demand of many that hours of labor be placed at an even lower figure serves to accentuate the prominence given to hours of operation in their relation to profits.

Perhaps the most significant development with respect to the particular proposal of a national 48-hour week was the advocacy of such a plan by a group of Alabama mill executives. In the past, it has been charged that those advocating the plan were already limited to 48-hour operation, as in the case of Massachusetts mills, or were more restricted than the average and thus had a purely selfish interest in the enactment of such a law. Regardless of justifiability of such criticism, certainly no such charge can be made against the Alabama group. The group was actuated by selfish motives in that the individual mills would profit as the entire industry profited, but they had less to gain than the average.

The most definite agitation for shorter hours took place in the silk industry. With leading manufacturers outspoken in their belief that something must be done to lessen the hours of mill operation, several conferences were held, but up to the present no definite plan has emerged. A parley was held in Harrisburg, Pa., at the instigation of Governor Pinchot, early in December, which was attended by many of the State's silk manufacturers. Later there was a meeting in New York of representatives of the labor departments of six States, namely, Maine, Massachusetts, Connecticut, New York, New Jersey and Pennsylvania.

It is understood that the representatives of the State labor departments favored the enactment of laws limiting the number of hours in each State. Manufacturers, however, pointed out that the enactment of such laws in certain States would only lead to migration of the industry and that a national law was the only solution.

The long road that textile thinking has taken on the question of hours is best exemplified by the appearance of a number of executives at Senate hearings on the Black bill, which would bar from interstate commerce goods manufactured in a plant operated more than 6 hours a day, five days a week. Although the textile executives mentioned did not agree with the proposed law in detail, the fact that they favored drastic reduction in hours is significant.

## *The Massachusetts Proposal*

Another development that attracted widespread interest was the proposal, made at the meeting of the New England Council by both Governor Joseph B. Ely and Henry P. Kendall of the Kendall Co., that Massachusetts declare a moratorium on its restrictive labor laws until the other States caught up. Specifically Mr. Kendall advocated that women be allowed to work until 10 p.m. While apparently this move is in the direction of longer hours, such is far from being the case. Both Governor Ely and Mr. Kendall favor shorter hours, but they believe that Massachusetts cannot afford to remain longer in its position of isolated leadership.

While not of paramount interest from the standpoint of profits, no survey of hours in the textile industry would be complete without mention being made of the many concerns that have shouldered their responsibility by aiding the share-the-work movement or have budgeted production to insure stability of employment.

Wages and hours have come to the forefront among the major problems of management. The setback suffered by the Cotton-Textile Institute in its voluntary plans for the shorter week and the elimination of women and minors from night work, and the fact that all divisions of the industry are plagued by a minority who cut wages beyond reason, serve to show the seriousness of the problems faced. Upon the sound solution of these and other problems depends the future of the industry in terms of profits.

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**not cut wages until wage reductions and consequent cut-throat competition in other sections of the industry compelled them to reduce costs by lowering their wage scale." *(From address as incoming president of National Association of Cotton Manufacturers.)***

**▶ WALTER C. TEAGLE: "As an outsider looking at it [the textile industry] in relation to our social order, I venture to predict that it will not be operating much longer as at present: on a basis which all too frequently requires that several members of one family—father, mother and children—must work to earn that family's livelihood; that involves longer hours than the public has come to regard as a fair day's work; or that employs women and minors on night shifts. Because those are matters that will not always be left to the decision of management." *(From address at meeting of directors of Cotton-Textile Institute.)***

**▶ HENRY P. KENDALL: "The length of the working week in cotton textiles must be reduced.... Perhaps a Cato who will thunder day in and day out 'Hours must be reduced,' might eventually bring a solution." *(From article in Survey Graphic.)***

**▶ GRANVILLE A. BEALS: "Wages in many (woolen and worsted) mills are now deplorably low, both from the humanitarian and the business point of view.... At present we—and I refer to the better manufacturers and merchandisers of this industry—are stymied by the wage chiselers and must proceed as best we can in an industry which suffers from the unenviable position of being dominated by its worst elements." *(From article in* TEXTILE WORLD.)**

**▶ AUSTIN T. LEVY: "I believe, and the word 'never' is a large word, that it will never again be possible for all of the people of the United States, who want to work, to be employed for as many as 48 hours per week, and this is nothing new in our history. Our whole industrial history has been a succession of the shortening of hours." *(From testimony on Black 30-hour bill before a Senate committee.)***

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# *Textile Standards...*

## MANAGEMENT NOT THOROUGHLY AWAKE TO THEIR ECONOMIC ADVANTAGES

IN A recent meeting of textile manufacturers, machine builders, and bobbin manufacturers, under the auspices of the Division of Simplified Practice of the Bureau of Standards, it developed that there are some 7,000 variations in filling bobbins. Although the bobbin producer has to face the inconvenience and plant inefficiency which accompany orders for such a variety of specifications, it is the textile manufacturer who has to stand the expense in the price he pays for the bobbins. It is to his interest, therefore, to see that standardization is effected.

The textile manager is on both sides of the fence in the broad matter of standardization. He should be concerned with its development in the products which he buys and in those which he sells. In the former case he gains a lower price, as just suggested, the opportunity to compare prices on the identical article, simplification and accuracy in the routine of his purchasing department, more certainty of receiving what he asks for, simplification and accuracy in methods for examining and approving the article when received, and better uniformity and quality in the things he buys. In the case of his own product he improves, as already suggested, his convenience and efficiency, lowers his overhead, puts a more attractive price on his goods, insures their giving satisfaction, maintains a more uniform operating schedule, and prevents his competitors from substituting an inferior article.

But the textile industry has not gone very far in the work of standardization. Particularly is this the case in the equipment used by the mills. In this connection, it is important to note that pressure for the standardization of an article usually has to come from the consumer —it seldom comes from the manufacturer.

Fortunately, however, some progress in the right direction is made every year. The following is a survey of the standardization work undertaken during 1932 by various associations and other organizations interested in the textile field:

1. *American Association of Textile Chemists and Colorists,* Lowell Textile Institute, Lowell, Mass. Has continued development of standard methods for determining fastness of dyed textile materials to all important color-destroying agencies, such as light, domestic washing, laundering, fulling, perspiration, acids, alkalis, sea water, crocking, shrinkage, and carbonizing. (Available in year book of association.) . . . . Now developing standard methods for analysis of sulphonated oils.

2. *American Home Economics Association,* 620 Mills Building, Washington, D. C. Recommended that, as standard practice, sheets and sheeting be furnished consumer with labels stating minimum tensile strength of warp and filling, minimum thread count, maximum percentage of sizing, ounce weight per square yard, width and length before hemming (sheets only), and whether firsts or seconds (sheets only). Similarly for blankets: size in inches, percentages of wool and cotton, tensile strength of warp and filling, and weight in pounds. (1932 leaflets: "When You Buy Sheets" and "When You Buy Blankets," 2¢ each.) . . . . Recommended percentage of weighting be designated on silks.

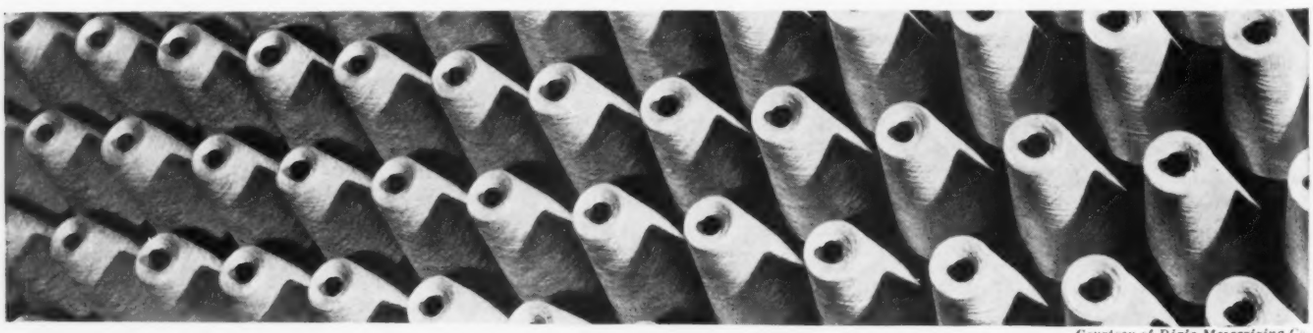
3. *American Hospital Association,* 18 East Division St., Chicago, Ill. Began work on standardization of material for mattresses and pillows.

4. *American Society for Testing Materials,* 1315 Spruce St., Philadelphia, Pa. Developed tentative specifications for tolerances and test methods for tubular sleeving and braids, including wall thickness, inside diameter, number of carriers, ends on bobbin, yarn number, weight, and imperfections . . . . Studying grease content of scoured wool and methods of test for woolen yarn, fabrics, and felts; holland cloth; hose, belt, and numbered ducks; and rayon yarns and fabrics. (Specifications available in booklet and reprint.)

5. *American Standards Association,* 29 West 39th St., New York. Procured copy of weaving-equipment standards adopted by German national standardizing body involving, for example, loom bolts, shafts, motors, filling forks, warp beams, and shuttles (untranslated).

6. *Bureau of Standards,* U. S. Department of Commerce, Washington, D. C.

*a. Division of Simplified Practice:* Recommended nomenclature, sizes, and methods of preparation of following surgical dressings made of gauze: sponges, abdominal packs, sterile gauze dressings, pads. (Tabulated and illustrated information, 5¢) . . . . Recommended lengths and other basic dimensions for paper cones and tubes for various knitting yarns, tire cords, wire-insulating yarns, etc. (5¢) . . . . Planning recommendations for spindle sizes for paper filling-yarn tubes, spindle sizes for wooden filling bob-



Courtesy of Dixie Mercerizing Co.

bins, and sizes of wooden cones for warp and knitting yarns . . . . Recommended put-ups, minimum lengths per pound, and minimum breaking strengths for fine unfinished flax twine and for fine finished and unfinished hemp twine (5¢) . . . . Revised 1928 recommendations for hard-fiber twine (5¢).

*b. Division of Specifications:* Revised National Directory of Commodity Specifications ($1.75) . . . . Prepared or is preparing specifications for men's knit drawers and knit undershirts; knit underwear sizes (exclusive of rayon); men's union suits; sheeting; toweling; towels; crinkle bedspreads; cotton handkerchiefs; table "linen"; pillow cases; sheets; and cotton, linen, and silk threads. (Copies obtainable from Superintendent of Documents, Government Printing Office, Washington, D. C.)

*c. Division of Trade Standards:* Made effective Jan. 1, 1932, commercial standard CS33-32 for knit underwear (exclusive of rayon) covering methods of measuring and measurements for: boys' flat-knit and ribbed drawers, flat-knit athletic and ribbed union suits, flat-knit athletic shirts; children's flat-knit and ribbed union suits, flat- and ribbed-knit cotton pants, sleeping garments, and vests; infants' bands and double-breasted or button-front shirts; men's drawers, flat-knit and ribbed athletic, polo, and pullover shirts; fleece, ribbed, and flat-knit union suits; women's knee-length ribbed drawers, ribbed union suits, ribbed cotton shaped vests and shoulder straps; box sizes; methods of washing wool and wool-cotton underwear; and a recommended system whereby the number of single yarn can be recognized by color of cone. (Copies obtainable from Superintendent of Documents, 5¢) . . . . Advanced commercial standard CS39-32 specifying amount of wool necessary in blankets before word "wool" can be used in connection therewith (5%), wording of labels on blankets carrying between 5 and 25% wool ("part wool, not less than 5% wool"), marking of blankets having over 25% wool (guaranteed wool content), distribution of wool fiber, size of type in label, and satisfactory testing methods (effective for new production Dec. 31, 1932; for clearance of improperly labeled goods, April 1, 1933) (5¢) . . . Made effective Sept. 1, 1932, commercial standard CS43-32 for grading of sulphonated (sulphated) oils, saponified types, covering method of grading oils that split off their organically combined $SO_3$ upon boiling with mineral acids, defining term "sulphonated oil," giving nomenclature and method of expressing strength or concentration, and describing methods of analysis for determining percentage of weight of various ingredients. (Mimeographed copies obtainable from division office while supply lasts.) . . . . Recommended commercial standard for hosiery lengths, covering method of measuring, lengths, and tolerances for women's full-fashioned, seamless, and ribbed cotton hosiery; men's, boys' golf, children's and misses' ribbed, children's $\frac{5}{8}$ flat-knit and $\frac{7}{8}$ hosiery; infants' ribbed hosiery; children's socks; and folded cuffs for infants' and children's anklets, boys' golf hose, and children's $\frac{7}{8}$ hosiery—including, for convenience of manufacturers, number of needles and size of cylinder recommended for various types of children's hosiery, infants' and children's socks, and boys' golf hose. (Mimeographed copies obtainable from division office while supply lasts.) . . . . Recommended commercial standard for men's shirts (exclusive of work shirts), providing that shrinkage of pre-shrunk material shall not exceed 2% when properly laundered and that word "pre-shrunk" or its equivalent shall apply to entire garment, except when word is followed by "collar" or "band." (Mimeographed copies obtainable from division office while supply lasts.)

*7. Federal Trade Commission,* Washington, D. C. Announced Jan. 28, 1932, acceptance by knitted-outerwear industry of trade-practice rules involving false branding of products, false advertising, price discrimination, secret payment of rebates, selling goods below cost, shipping goods on consignment without bona-fide orders, usurping designs or styles, terms of sale, individual freedom in establishing prices, arbitration, and creation of trade-practice committee. . . . Announced June 18, 1932, acceptance by silk industry of trade-practice rules involving labeling and definitions of weighted goods ("containing . . . . more than 10% of any substance other than silk . . . . except black, which shall not exceed 15%"), pure-dye goods (containing not more than percentages of foreign material just specified), and mixed goods ("designation . . . . shall reasonably indicate that such goods contain fiber other than silk") . . . . Interpreted rule published for knit-underwear industry July 7, 1930, as follows: "Percentage of wool should be stated on garment and container and wherever the word 'wool' is used in the label or advertising; and further, that unless the material in question is all wool (less 3% tolerance) the percentage of wool must be stated."

8. *National Association of Hosiery and Underwear Manufacturers,* 468 Fourth Ave., New York. Recommended various items for proposed commercial standards on hosiery lengths (see paragraph 6*c*) . . . . Made over 29,000 measurements for width and length of welt, leg, high heel, heel, sole, instep, and toe of men's and women's full-fashioned and circular hosiery, tabulating them and plotting graphs for further study. . . . . Conducted tests toward standard method for evaluating colors of raw silk.

9. *Silk Association of America,* 468 Fourth Ave., New York. Raw-silk-classification committee revising standard photographs for evenness, neatness, and cleanness and cooperating with Japan toward international standard . . . . Approved standards for examination and grading of finished broad silks (leaflet issued Sept. 21, 1932.) . . . . Revised raw-goods-contract form Dec. 14, 1932. . . . . Standardized spun-rayon numbering system as follows: "The number of 840-yd. hanks contained in one pound . . . . at standard conditions. The count of plied yarns is that of the singles yarn from which they are spun; thus, 60/2 ply spun rayon is two ends of 60 singles. . . . ."

## *TEXTILE ITEMS on which standardization work was conducted during* 1932.

**(Numerals and letters following items refer to paragraphs in accompanying survey.)**

| | | | | | |
|---|---|---|---|---|---|
| Bedspreads | 6*b* | Outerwear, knitted | 7 | Sleeving, tubular | 4 |
| Blankets | 2, 6*c* | Pillow cases and pillows | 3, 6*b* | Spindles | 6*a* |
| Braids, tubular | 4 | Pre-shrinking | 6*c* | Sulphonated oils | 1, 6*c* |
| Cones | 6*a* | Rayon fabrics and yarns | 4 | Surgical dressings | 6*a* |
| Ducks | 4 | Rayon, spun | 9 | Table "linen" | 6*b* |
| Dye fastness | 1 | Sheeting and sheets | 2, 6*b* | Thread | 6*b* |
| Felt | 4 | Shirt shrinkage | 6*c* | Toweling and towels | 6*b* |
| Handkerchiefs | 6*b* | Silk classification, raw | 9 | Tubes | 6*a* |
| Holland cloth | 4 | Silk color, raw | 8 | Twine | 6*a* |
| Hosiery | 6*c*, 8 | Silk fabrics | 2, 7, 9 | Underwear | 6*b*, 6*c*, 7 |
| Looms | 5 | Silk mixes | 7 | Woolen fabrics and yarns | 4 |
| Mattresses | 3 | Silk weighting | 2, 7 | Wool, grease content of scoured | 4 |

**Only standards of direct interest to mills are recorded. Many associations contributed to standardization work of government departments; but, unless they also established or conducted work on independent standards, no mention of their contributions is made. (Details on each standard obtainable from the sponsor. In writing for government publications, it should be remembered that postage stamps are not accepted in payment.)**

# *Leadership*

## FROM TRADE ASSOCIATIONS IS UP TO THE INDUSTRY

THE textile industry is disappointed in its trade associations. That fact, we believe, is pregnant with significance for the future.

By making the above assertion, we do not mean to imply that this feeling of disappointment is warranted; we merely state what we regard to be a truth. As a matter of fact, it is our conviction that the industry, after shackling its organizations with the limitations of its own thinking, is disappointed that more progress is not made despite those shackles. . . . . Unreasonable, it is true, but human.

Let us look at the textile associations, broadly, for a moment. They can be judged on three counts: personnel, accomplishments, leadership.

On the first, we doubt if any industry has had, or has, a higher type of personnel, both paid and honorary, in its coordinated activities than has textile manufacture.

Men like Fitzgerald, Geer, Cramer, Callaway, Beattie, Vereen, Dixon, Hutchison and Gossett, with Secretary McLaurine in the American Association, and like Amory, Baylies, Buxton, Thoron, MacColl, Butler, Lowe, Southworth and Hood, with Secretary Fisher in the National Association, represent a roster in the cotton industry which needs no apologies. Walker Hines, and his successor George Sloan, have left their mark upon the Cotton-Textile Institute. A. D. Whiteside, in the Wool Institute, and the many outstanding men who headed the old American Association of Worsted and Woolen Manufacturers, as well as the National Association of Worsted and Woolen Spinners, lose nothing in stature, in retrospect, merely because those organizations are now defunct. Franklin Hobbs with Secretary Humphries in the National Association of Wool Manufacturers, has persevered through all the vicissitudes of cooperation in the wool industry. Ramsay Peugnet, probably the dean of textile association secretaries, has had affiliated with him a line of presidents of the Silk Association who represented the cream of that field; Cheney, Goldsmith, Post, Schniewind, Hill, Gerli, are but a few of these. John Nash McCullaugh, and his successor in the hosiery association, Earl Constantine—in league with men like Mettler, Meyer, Galbraith, Oberlaender, Andrews, Zens and Bausher; Roy Cheney, and an equally illustrious line of dynasties in the underwear field; and a group of leaders in outerwear, are among the leading lights in knit goods. This list could be extended almost indefinitely.

Accomplishments? . . . . Well, the part the Southern Textile Association has played in improving mill technique in that section; the "women and minors" and "55–50" policies of the Cotton-Textile Institute; the tariff fights staged by the two major cotton associations and by the National Association of Wool Manufacturers; the research activities of the National Association of Hosiery and Underwear Manufacturers and of the American Association of Textile Chemists and Colorists; the statistical program of the Association of Cotton-Textile Merchants—these, and a dozen or so more, have been cited by outsiders as real accomplishments.

There is still the third count: leadership. Anyone who says there has been no real leadership in textile associations doesn't know his history. And yet, on all sides, there is a clamor for more leadership. The answer, we believe, is found in the second paragraph of this article.

Textile manufacturers want leadership but through lethargy, or traditional resistance, or both, they consistently refuse to give their leaders the support and freedom which are necessary.

This is no academic question today. It is tied up with the whole problem of profit possibilities. Never before have so many complex economic and social problems cried for frank and concerted attack.

### *Plenty of Problems*

First, and probably most important, is the whole question of wages, hours of labor, night work, and allied phases of the employer-employee problem.

Then there is the matter of price policy: the difficult problem of curbing the price-cutter within existing legal restrictions—and of developing an attitude of sanity in this direction.

New laws are being concocted in Washington; the next year or two will produce probably some of the most unique legislation ever devised. Manufacturers need to protect their own interests—but they do not want to be negative. This is a field for constructive leadership.

What are we going to do to secure revision of the anti-trust laws—and what are we going to do with those laws when and if they are revised?

These are but a few of the problems ahead of us. Associations, through their headquarters staffs, cannot wage that fight alone. If they tried to, they would get so far ahead of their processions that they wouldn't have any parades.

It is so easy to sit in the grand-stand and criticize. Singularly enough, it is easy to pick up a banner and join the parade, but not enough manufacturers have learned that fact as yet.

Until they do, there will be a call, and a need, for leadership—and a lot of potential leaders who are not given the chance to really lead.

## II—Money-Making Merchandising

***No mill—whether it produces a staple product for further fabrication or creates a complete article for consumer use—can dodge merchandising as one of the major problems of management. The differential between good and bad distribution policies and practice represents the difference between profit and loss. This section treats of the fundamental factors in textile merchandising today.***

# *Accurate Sales Costs*

## AS DETERMINING FACTOR IN MERCHANDISING POLICY

***By James A. Austin***
*New England Editor,* TEXTILE WORLD

SCIENTIFIC analysis of the cost of selling is nothing new, but there has been a marked increase of late in the number of textile concerns that have tackled this problem in the same manner that manufacturing costs have been subjected to exact methods of accounting. As will be seen, the development is of interest not only to the mill producing and merchandising a more or less finished product, but also to the staple mill, no matter what the selling arrangements of such a mill may be.

Just what interest a mill paying a fixed percentage to a selling house has in an analysis of sales cost is not immediately clear. In fact, one executive of a gray goods mill goes so far as to say:

"There has been a lot of talk about textile manufacturers giving more attention to the problems of distribution, but, as far as this mill is concerned, I'd be foolish to waste much time on the subject. Raw material and production costs account for 98% of my total cost. The other 2% goes to the selling house and, what is more, it is a fixed expense. Even if the selling house cut the rate by 10% it wouldn't make much difference, but a reduction of even 3% in production cost would amount to quite a saving. The natural result is that I concentrate on production."

Despite this apparently logical statement, one peculiar feature has been brought out by analyses of selling costs which is that it is possible for the *actual* cost to such a mill to be considerably higher than 2%, and that the mill, therefore, has a vital interest in the problem.

The paradox of selling cost being higher than the fixed percentage is best explained by an example which, although hypothetical as to details, is based upon actual fact:

The mill makes two fabrics—*A* and *B*—which account for an equal percentage of production. Fabric *A* is sold in a market where purchasing is fairly well concentrated and fabric *B* in a market where purchasing is scattered. The selling house receives 2% on *A* and 3% on *B*. An actual analysis of cost showed that the selling house was expending 1% on *A* and 4% on *B*.

### *Actual Sales Costs*

At this point it might be said that the problem is of no concern to the mill and that the selling house evens up anyway, but the investigation also showed up other important factors. It was determined that if sales effort were expanded, territorially, on *A*, and the full 2% expended, the increase in sales would amount to about 50%. It was, however, impossible for the selling house to do this—if bankruptcy was to be avoided—as there was a deficit on *B* and it was essential to save 1% in selling *A*. As the mill is not receiving its share of the business and is currently operating at 60% of capacity, the difference in production cost between 60% operation and 90% operation on *A* must be chalked up as a *selling* expense.

On fabric *B* it is only natural that the selling house, already handling this fabric at a deficit, will economize as much as possible. Here again it is the mill that suffers.

Whether the mill makes one product or 100, whether it sells through an independent selling house or direct, the same principles apply. There has been a considerable amount of discussion about the advisability of changing commission rates, particularly since prices are so low. Unfortunately, most of the rates have been a matter of tradition. Resetting rates on the basis of what selling actually costs by lines and by territories, and analysis of just what expenditure is justified on a given line, is as of much concern to the mill man as it is to the selling house.

When we come to the mill that produces and merchandises a finished product, exact details of the selling cost by lines, by territories and by salesmen, are of course of great importance in formulating policies. Further, the hardy perennial of whether the manufacturer should sell through wholesaler and/or retailer is susceptible of solution only through knowledge of the cost of distributing through the various channels.

The position of the wholesaler in textile distribution has been the subject of much debate—some of it not very friendly. Stripped of details, the situation is simply that if the wholesaler assumes a certain proportion of the expense of distributing to retail stores he is entitled to payment. On the other hand, just because he is listed as a wholesaler, he is not entitled to payment for functions that he does not perform.

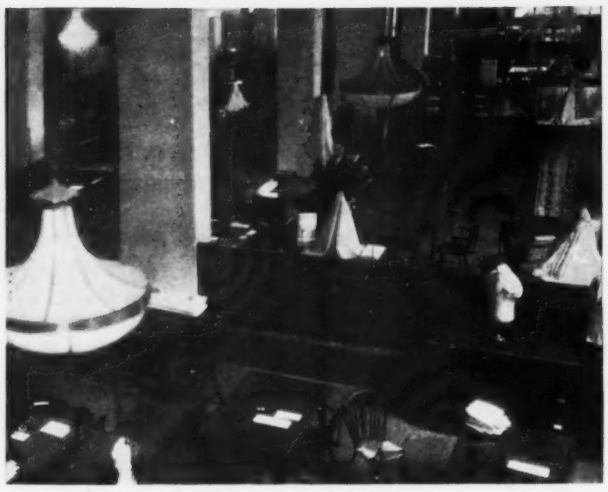
Between the manufacturer and the retailer there are the following items of cost: salesmen, office expense, transportation charges, warehouse charges, promotional expense and credit risk. At one extreme is the wholesaler who buys in large quantities from the mill, carries adequate stocks and expends large sums in promotional work, whether through national advertising of a brand name or otherwise. At the other extreme is the wholesaler who buys in case lots, doesn't carry stocks and indulges in no promotional work. Obviously, the manufacturer is under far less expense when selling to the first than when selling to the second. The first performs an economic function and is entitled to the full discount. The second is entitled to no more discount than a retail establishment that buys a like volume.

The manufacturer who knows how much it costs to sell wholesalers of the better class, who knows the cost of selling to the wholesaler-in-name-only, who knows the cost of selling to chain-stores, and who knows the cost of selling the retail trade, is in a position to make an intelligent decision concerning the channel, or channels, that should be utilized in the distribution of his product. Without such data guesswork must prevail and, in many cases, the result is a series of controversies with wholesalers.

Three courses are open to the manufacturer: selling to wholesalers entirely, selling to wholesalers and large retailers, and selling to retailers entirely. For a given manufacturer, the method that, considering *all* cost factors, is the most economical is the method that should be followed.

### *Selective Distribution*

It is where the manufacturer sells to both wholesaler and retailer (to say nothing of chains and buying syndicates) that a plan equitable to all concerned is the most important. In this connection the so-called "selective distribution" plan is of interest. Primarily it is based on cost, but consideration is also given to other factors.



The set-up of a typical example of selective distribution is as follows:

After careful study of the various wholesalers, the manufacturer selects one in each district. This wholesaler will handle the manufacturer's goods exclusively in that territory and will not handle any competing lines. Adequate stocks will be carried by the wholesaler and it is understood that he will not attempt to spread out beyond a certain territory. Quantity discounts are arranged so that the wholesaler can sell to chain-stores and large department stores as well as the smaller retailers.

Suppose, for the sake of illustration, that the wholesaler receives a discount of 15% on small retail accounts. When selling a large department store, 10% is passed on to the customer in the form of a quantity discount (if earned) if the the wholesaler ships from stock. If the customer takes delivery from the mill there is an additional discount of 3%. Thus on direct mill shipments the wholesaler receives only 2%, but sales cost is lowest on such business. Whether the customer sends the order direct to the mill or not makes no difference.

The actual discounts for a particular case are set up after study of the cost of performing certain functions has been determined and various market factors taken into account. The wholesaler is expected to show a fair profit under normal conditions.

A few of the advantages of such a plan are: The manufacturer and wholesaler are almost partners; the wholesaler is protected and is more inclined to push sales; the manufacturer does not have several wholesalers going around competing for business with the same product; emphasis can be placed on quality rather than price.

The principal objection is that any one wholesaler does not reach all classes of trade in one locality. Thus, one wholesaler may do 90% of his business with the better-class stores while another may cater to a cheaper trade. For this reason, selective distribution fits into the picture best where the manufacturer's line does not extend over too wide a price range and where the product is known to the retailers.

Many controversies between manufacturers and wholesalers would be avoided if the manufacturer predicated his policy on facts and not hunches. The industry has made considerable progress in applying accurate cost accounting to mill operations. Application of the same principles to selling will reveal many discrepancies and will serve as a solid foundation in the formulation of policies. This holds true no matter what the product.

# *Competition Lessened*

## BY COMMUNITY OF INTEREST IN FUNCTIONS OF DISTRIBUTION

FOUR movements that have gained momentum during the last year have an important bearing on the problem of bringing centralized control to the highly decentralized textile industry. Without regard to their relative importance, they may be listed as follows:

1. Tendency for the mills represented by a certain selling house to assume control of selling organization.
2. Increase in the influence of certain selling houses by the acquisition of additional mill accounts.
3. Diversification carried out by mills merchandising a finished product, whereby allied lines are also handled; either direct purchase of the business or a selling arrangement being the method employed.
4. Increase in the concentration of factoring business.

The best example of the first tendency is the formation of Southeastern Cottons, Inc., to succeed to the business of the Hunter Mfg. & Commission Co. Where the Hunter organization was financially interested in many mills, the opposite is the case with Southeastern Cottons in that the capital for the selling organization is supplied by the mills interested. The most obvious advantage of such a set-up is that the mills now have a community of interest through their holdings in the selling company. It is expected that other mills will acquire an interest in the organization and thus increase the already large volume of business (estimated at $40,000,000 annually) handled under a unified sales direction. As previously noted, Howard E. Coffin, prominent industrialist, will be chairman of the board of Southeastern Cottons and Frederick H. Payne, Assistant Secretary of War in President Hoover's cabinet, will be president.

While the formation of Southeastern Cottons is the most important development in its line, there have been many other instances where mills have acquired a definite interest in the welfare of the selling house.

*A busy hour on Worth Street*

Two examples will serve to illustrate the second movement listed. Floyd W. Jefferson, of Iselin-Jefferson Co., has long advocated both in private conversations and in articles appearing in TEXTILE WORLD and elsewhere, the merger of selling houses. During the last year Iselin-Jefferson has added the following to the list of mills for which it sells: Pitman Mfg. Co.; Ideal Hosiery Mills; Knoxville Knitting Co.; Pryor Hosiery Mills; Bottum & Torrance Co.; Conestogo Cotton Mills, Inc., the pillow-tubing line of Wauregan-Quinebaug Mills, Inc.; Jefferson Mills, and Beaumont Mfg. Co. No. 2 Mill. Most of these mills formerly sold through Amory, Browne & Co. and, although there was no real merger, the arrangement accomplished much the same result.

Another example of an enlarged selling organization is the Cone Export & Commission Co. This concern, in addition to the mills directly owned, now also sells for the Appleton Co., American Spinning Co., Florence Mills and the Pacolet Mfg. Co. Over 50% of the cotton flannels produced in this country are now handled.

Diversification through the addition of allied lines is illustrated by Cannon Mills and the Nashua Mfg. Co. Cannon diversified its line by taking on the sale of the blankets produced by the Leakesville Woolen Mills, Inc., and is now probably the largest factor in the world in finished goods for the home. Nashua used a somewhat different method in purchasing the Dwight Mfg. Co. to secure a branded sheeting line to complement its blankets.

The amount of factoring business controlled by the Commercial Investment Trust Co. was further increased during the year by the acquisition of William Iselin & Co., Inc. The total business handled by the factoring subsidiaries of C.I.T. amounted to about $170,000,000 in 1932, despite the low level of prevailing prices. The old factoring concerns brought under control of C.I.T. to date are: Peierls Buhler & Co.; Fred'k Vietor & Achelis; L. Erstein & Co.; Schefer, Schramm & Vogel; Morton H. Meinhard; Greeff & Co.; William Iselin & Co. The first four operate under the title of Commercial Factors Corp., the next two as Meinhard, Greeff & Co., and the last independently.

To the average mill, the fact that there has been concentration along the lines indicated above means little in itself. What *is* significant is that all such moves mean a decrease in amount of competition, whether in sale of goods or in credit competition. The more large, strong selling organizations there are the better the chances of the average mill, no matter what its sales policy. The more concerns whose financial affairs are more or less handled by a few of the large factoring organizations, the greater the steadying influence.

# New Style Concept

## WOULD CHECK PIRACY AND YIELD DOLLARS-AND-CENTS RETURN

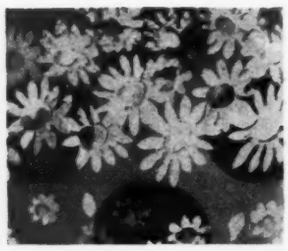
*By John Black*

THERE is no problem more threatening to the textile industry today than that of design piracy. This applies equally to the prints in the broadsilk and cotton divisions, and to the weaves in woolens and worsteds as well as in silks and cottons. Efforts are being made to curb the evil by legislation and organized effort. That is a logical step, and, unquestionably, is helpful. But it does not get to the root of the evil. Coercion or the threat of a law-suit has never proved the permanent solution of a commercial problem. Let us forget the superficial aspects for a moment and dig down into fundamentals. We will find, not only the basic causes of textile piracy, but also roads leading to its possible elimination.

Let us first consider the primary question: What is style? I accept Dr. Nystrom's admirable definition. He characterizes style as the creative development by the textile artist, and fashion as one, or many, derivatives of a style. Style, briefly explained, is the artist's reaction to national or international mood. Glancing back over the last 15 years, we find style has reflected faithfully the spirit of nations and peoples. Paris, always the fountain-head of fabric styling, decreed black and somber effects immediately after the war, and the world followed Paris. Then the war mood passed, and in 1922 Paris turned to dressy types, which were followed equally suddenly by a reversal to simplicity.

In Paris—or anywhere in Europe, for that matter—the stealing of designs is a minor issue. Textile piracy is peculiarly an American institution. Why should this be? The answer is found in a study of French methods. The Paris fabric designers and dress designers work in complete cooperation. In one instance a fabric designer showed a new pattern to Jeanne Lanvin, who promptly rejected it explaining that she wanted soft fabrics for her new dresses, whereupon the fabric designer returned to his studio and developed the material desired. The key to the whole situation is that Paris designs for the individual, while America manufactures for the mass. Paris designs 100 new prints or weaves, but the industry there is so acutely self-critical and so rich in new ideas, that 75 of these will be rejected. Such drastic elimination means that the 25 which are accepted are the nearest thing to perfection of which humans are capable.

Contrast that with the American practice. We have 100 new designs and grudgingly drop 25. However, of the remaining, 50 are inferior fabrics, which when put on the market, simply mean unprofitable selling, and when it is all over, we are back to the original 25 chosen by the French.



*Silk designs by Bianchini showning how*

Now let us look into the Paris method of creating styles. There is a cue for the American trade here. Recently, as the accompanying illustrations show, one fabric house decided to popularize the daisy. One daisy design was offered; it won acceptance. Then, by the simple expedient of varying the shape, size or grouping of the daisy, a whole series of designs followed, each sufficiently different to be new, and each successful. So completely has Paris mastered the thought of developing different fashions from one basic style, that the task is almost child-like in its simplicity. I was told recently of a designer who changed one popular design into a new and instantaneously successful one, by clipping up the figures with a scissors and rearranging them.

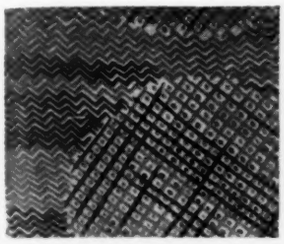
Simple though this seems, however, it remains genius. It remains the secret of artists. Our problem is that we have to think in terms of big output. We cannot experiment with 100 yd., as Paris does. We must rush to 10,000 yd., to cover our terrific overhead. Always remember, the overhead in Paris is very small, due to small-scale, individualized activity. And there is no pat solution of this problem awaiting us. Truly, it would seem that each has its native function—Paris to create, we to manufacture. We are not creative textile artists, as a race—yet. Here and there, notably in New York, there is a tendency toward native textile design development, but it is still in the primary stage.

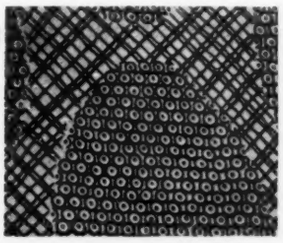
Meanwhile, however, there is much that we can do. We can encourage our print designers to put their individuality into borrowed designs—not to copy them. We can support our mill technicians in their efforts to add a distinctive new touch to the weaves that come from abroad. Let us try to "make two styles grow where one grew before." The French view each other's styles—but they never pirate; it is temperamentally impossible for them; they are too sure of their own ability. And how absurdly little it takes to change a design! One Frenchman views the peach print of a compatriot and

likes it; shortly thereafter he comes out with a delightful copy—but he makes it grapes instead! That is the very opposite of piracy; it is constructive, and it gives new life to a basic style trend.

Let us remember that when an idea, be it in the printed design or in the weave, is improved and developed, it means growth of style and a wider fashion appeal. It actually helps the design or weave from which it was taken. But the pirated idea is unhealthy; it is inbreeding and it just dies for lack of originality.

If the American manufacturer or his designer, can take an imported or domestic textile pattern, work it over, give it some new lights or shadows, then he will not only save a good design from death but he will make business for himself, for the particular fashion he uses —and last but not least, the style itself will continue alive and healthy.

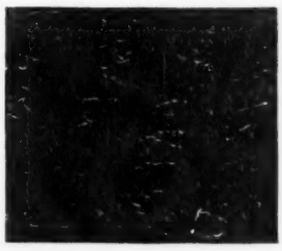




*slight change will produce a new design*

This brings us to the merchandising side of the picture. The outstanding thought here is the changing status of the so-called style consultant. She really has become a style merchandiser. She must know practically every angle of textile production, since all divisions contribute to make a success or failure of her style creation. She must conceive the style with a complete picture in her mind of how it will tie in with the firm's mechanical equipment, price range, selling seasons, how it will parallel current apparel trends, how it will look in the proper shades—in fact, the whole vertical route through to the ultimate consumer. This is definitely a constructive trend, and should do much to help the manufacturer solve his style problems. The better equipped the stylist is in mill knowledge, the nearer we will come to meeting our problem of design piracy. She is an important link in the chain; often enough American stylists who do originate designs in cooperation with mill technicians, have the unhappy experience of seeing their patterns pirated—almost before they are on the market!

When analyzing fabric styles in their relation to piracy, we must keep in mind that firms which specialize in copying are definitely geared to that function. It is not chance that makes a company turn textile pirate. These firms follow that as a clear-cut business policy,



*Wool goods weaves showing how mill technician develops new weave fashion by slight variation in style*

and they could not suddenly become legitimate creators without important changes in organization. First and foremost, such firms have no style department; they make no attempt to add the magic touch to a design which would turn it from a copy into a new fashion. Yet the fact remains that reorganization of their business along creative lines would in the end prove more profitable.

Consider briefly the broad trend of fabric style in printed design. The steadily improving taste of the American woman is bringing her farther away from the garish, from loudness and toward delicate and subtilely artistic patterns. It seems likely that hereafter all variations of style will be compressed within a narrow range involving color or tone change, space change, change in the total number of colors used, and then adventures into floral and geometric patterns. This does not limit the manufacturer any more than it limits Paris, but it imposes upon him the necessity of insisting that his stylists and designers be something more than mere copyists; they must develop creatively.

The foregoing has concerned itself chiefly with the design fundamentals which apply equally to the print and to the weave. A word now about the weave itself. Weave piracy is as widespread as print piracy, and for the same reasons—failure to add an original touch to the design. In the woolen and worsted field, where the weave is paramount, the issue of design revolves about the mill technician. If he gets a new fabric from abroad and interprets it in terms of his own thought, then he is doing a creative job, a job that will make money for his firm. Frequently when he does not, it is because of lack of cooperation in buying yarn, cutter relationship, or support by his own selling office.

In weave styling even more than in print styling it is imperative that the American manufacturer become something more than a copyist, if he is to survive. Because of the time element in making woolens and worsteds, the original design is slow in production and

the pirate catches up before it has any chance. Obviously, the pirate is followed by other pirates, so that none finds the design profitable. Yet there is a vast field of weave possibilities, which each of these pirates could explore if he spent some money and hired a competent technician. Modern equipment has widened the horizon of the mill technician to such a point that truly he is limited only by his own creative power.

Such then is the picture of the major style problems facing the fabric manufacturer. If piracy seems inordinately in the foreground, it is because of the basic relationship between piracy and style itself. So long as we fail to originate, we will have piracy; and, since the practice has such fundamental roots, legal restrictions can never hope to eliminate it completely. Real elimination will come when the manufacturers themselves consider their designers and mill technicians as of major importance in the organization, and when these designers and technicians are competent enough and creative enough to develop individual fashions, rather than to kill a style by ruthless duplication.

# *Customer Cooperation*

## POINTS THE WAY TO PROFITS

ONE of the most significant benefits the depression has brought to the textile industry is the marked increase in vertical coordination. Manufacturers are coming to recognize that in all divisions, from production of raw material to sale of finished product to the ultimate consumer, there is a definite mutuality of interest. This is particularly true as regards customer cooperation, market analysis and sales promotion. The new trend gives a wider definition to the term "customer." No longer is it adequate to look merely to the actual buyer of raw material, yarns or fabrics as the customer. Now, when the up-to-date manufacturer analyzes his market, he goes through his immediate customer division, and studies the customer's customer, continuing vertically down to the final service of his product as enjoyed by the person who buys it in a store.

This policy has been followed for some time by mills making consumer goods, though here too it still needs broader application. Among mills which do not produce directly for the consumer, however, it represents a new departure, and an analysis of the situation at that end brings to light numerous interesting facts.

Outstanding among the more recent aspects, is the changing situation with regard to developing new uses. Pushing the product into hitherto undiscovered markets, is perfectly sound up to a certain point, but this must not be done to the strangulation of existing markets.

It is essential this year that the manufacturer beware of going blindly into super-expansion without realizing common-sense limitations. Often a market for yarn or fabric may show signs of infinite consumer expansion when studied in terms of the first customer division, yet this market can suddenly reach the saturation point for reasons which would have been learned beforehand if the market research had been carried through to the ultimate consumer.

At the servicing end, we find that many mills in the intermediate divisions have disproportionately curtailed both their laboratory and their customer-cooperation activities. While a certain curtailment seems logical, considering conditions, extreme steps in this direction are bound to react adversely to the mill. The point to keep in mind is: Service today constitutes part of the sales program, and it is no more logical to drastically curtail service than it would be to begin wholesale reduction of sales personnel. The textile manufacturers who have maintained reasonable operation of service and research divisions, are in line for a double benefit: First, their immediate profit and sales prospects are better, and, second, they are putting themselves in a stronger position for the post-depression improvement.

One feature of the current merchandising tendency is that it has greatly accentuated the importance of the label. The label this year is a major selling influence; it is at once a test of quality and a safeguard for the store's customer. During the second half of 1932, the quality agitation went through several transformations. Gross abuse of the term "quality" by certain manufacturers and distributors who simply re-wrote their promotional and advertising material without any improvement in production, made the consumer ultra-skeptical of quality claims. The outcome is a demand for, (a) quality in proof, and (b) quality in use. Quality in proof must be established by some label guarantee, either that of the manufacturer who incidentally must support his guarantee with laboratory report, or that of the distributor who may be equipped to test merchandise and thus convince the customer that the quality claim is bona fide. By quality in use, we mean that the merchandise must be up to standard in all particulars—good fiber, good yarn, good fabric, and properly manufactured into good apparel or other merchandise.

Manufacturers who do not make consumer goods now are coming to recognize that they must protect their raw material, yarn or fabric, in the industries which directly or indirectly are their customers. This is an important development and marks a step forward. It must be remembered that in the vertical evolution of merchandise, manufacture may be 99% perfect, yet the single weak link in the chain, as for example, poor weaving of good yarn, can spoil the final sale. In other words, the sale of raw material is not complete until it gives 100% satisfaction to the customer buying the finished merchandise.

Training of salesmen is one aspect of textile merchandising which has been deplorably ignored, yet it is a vital element. Quickened into alertness by conditions, some mills are progressing along this line, but much yet remains to be done. The textile salesman of today, by and large, sells in the same easy-going fashion of his grandfather. It is essential that he catch the spirit of balanced production, that he understand new uses, and appreciate such trends as the quality movement; this broader viewpoint would help materially to steer him away from price-selling and should be a matter of first consideration with mills this year.

It is surprising but true that the average retail sales clerk today knows more about the manufacture of textiles, than the manufacturer's salesman knows about the retailing of them. While retailers could go further with their educational work of this type, already they have gone further than the manufacturers. In conclusion, it might be suggested that the manufacturer would strengthen his sales position if he organized classes for instruction of salesmen on the markets beyond their immediate horizon. Following the same thought, the yarn mills should come closer to their final markets, by developing style departments in charge of stylists who are equipped to work with salesmen in promoting the yarns vertically through the fabric division to the consumer.

# *New Fabric Styles*

*By Hélène Volka*
*Textile Design Consultant*

## FORECAST FOR SUMMER AND FALL

*New ideas in prints from Moss & Still*

IN FORECASTING any part of the textile style program for 1933, it may be said that the depression, having served to eliminate futile promotion and merely experimental design, has actually served to advance the cause of American textiles to a remarkable extent. Enlightened styling rests upon and proceeds from research in the search-light sense, which seeks out facts and pays small heed to rumor, gossip, or the dying gasps of traditional effort. Enlightened styling also invites comparative estimates of values in the introduction of new elements, such as ostrich, rabbit, angora; in the roughing-up process; or the utilization of nubs, thick and thin slub yarns and the introduction of kemp.

Highly styled woven specialties, long known as exclusive "French ideas designed for the high-priced trade," now find themselves in strange quarters—in the world of magic that can turn out a $3.75 suit with a blouse, rivalling today's $59.50 in appearance at least. Occasionally one is seen which in woven material could readily take its place in the $98.50 group, a transition due to yarn-blending in the knitted novelty field where textures present the appearance of expensive loom productions.

The soft hand that has been so pleasing to feminine judgment in the last eighteen months, has veered sharply toward rough and nubby novelties, precipitated by the success of the ratine family in all fiber groups.

Creped textures, however, are toning down to a conventional morocain phase, leaving the deeply grooved face of woven-in construction as an outstanding coating in silks and woolens, with cottons similarly disposed. Mossy cloths offer to the coating field for fall opening an influence that carries over the ratine group.

Counter to these, the suede family is destined to careful reconsideration in de luxe collections. Broadcloth, having risen to a new height in the February French openings as a brilliant color coating designed to offset the black afternoon and evening gown, is unquestionably due for new stimulation in the exclusive coating lines for fall. This broadcloth trend can readily restore a semi-lustrous face as its newer note, owing to the profound impression created by the superb satins introduced by all leading couturiers for formal evening wear. Silk houses interpret this as a saving grace under present conditions. The angel-skin conquest brings this satis-

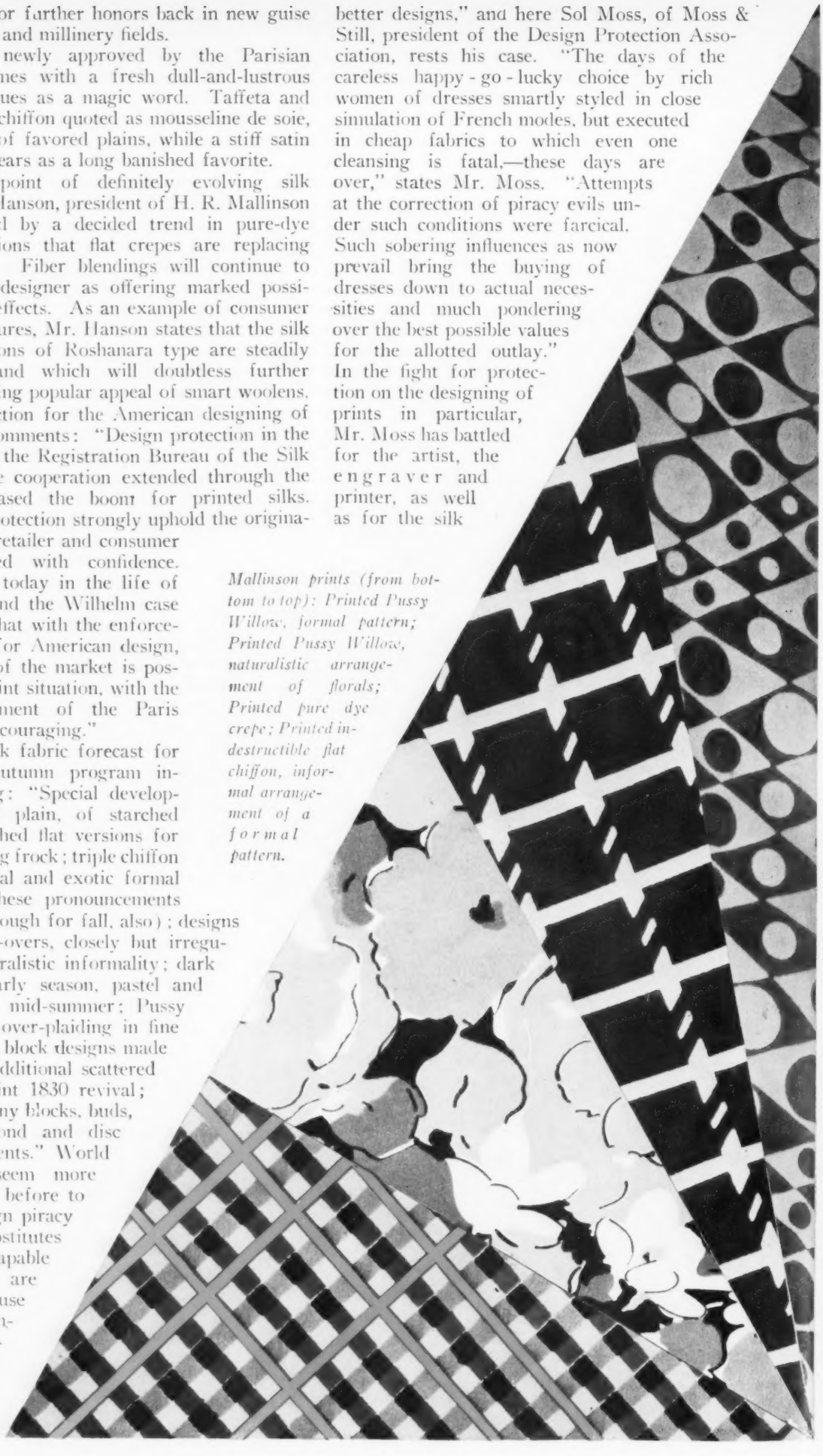
factory contestant for farther honors back in new guise to the dress, coating and millinery fields.

Luxury fabrics newly approved by the Parisian Couture include lames with a fresh dull-and-lustrous aspect. Cire continues as a magic word. Taffeta and organza, a starched chiffon quoted as mousseline de soie, are high in the list of favored plains, while a stiff satin damask brocade appears as a long banished favorite.

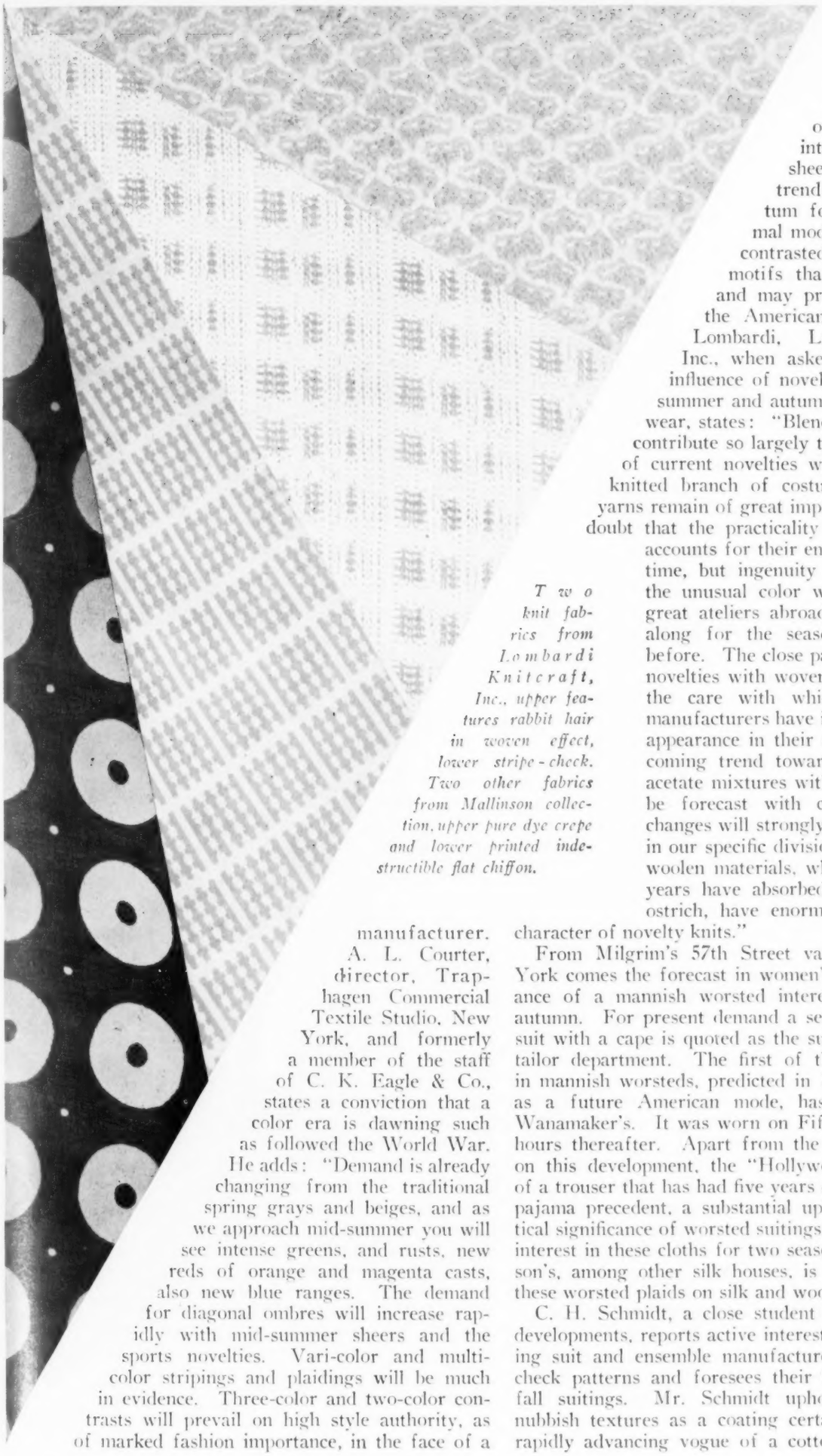
From the standpoint of definitely evolving silk textures, E. Irving Hanson, president of H. R. Mallinson & Co., is impressed by a decided trend in pure-dye fabrics and indications that flat crepes are replacing the rough textures. Fiber blendings will continue to interest the textile designer as offering marked possibilities for original effects. As an example of consumer liking for such mixtures, Mr. Hanson states that the silk and wool combinations of Roshanara type are steadily increasing in demand which will doubtless further increase with the rising popular appeal of smart woolens.

Concerning protection for the American designing of silks, Mr. Hanson comments: "Design protection in the U. S. Patent Office, the Registration Bureau of the Silk Association, and the cooperation extended through the printers, has increased the boom for printed silks. Specific means of protection strongly uphold the origination of design, and retailer and consumer response is awaited with confidence. Prints are a staple today in the life of American women, and the Wilhelm case has given evidence that with the enforcement of protection for American design, a new stabilization of the market is possible. The entire print situation, with the unreserved endorsement of the Paris openings, is most encouraging."

The Mallinson silk fabric forecast for mid-summer and autumn program includes the following: "Special developments, printed and plain, of starched chiffon, and unstarched flat versions for the dinner and dancing frock; triple chiffon prints of semi-formal and exotic formal types of design (these pronouncements indicate a follow-through for fall, also); designs of formal floral all-overs, closely but irregularly spaced in naturalistic informality; dark grounds for the early season, pastel and pearly grounds for mid-summer; Pussy willow checks with over-plaiding in fine lines of color; small block designs made newly effective by additional scattered small florals, a quaint 1830 revival; diagonals showing tiny blocks, buds, dots, dashes, diamond and disc in striping arrangements." World conditions today seem more favorable than ever before to the solution of design piracy problems. Cheap substitutes for worthy fabrics capable of prolonged usage are being rejected. Because of more resolute consumer demand, purchasing will be gaged by serious needs. "Upon better fabrics, better designs," and here Sol Moss, of Moss & Still, president of the Design Protection Association, rests his case. "The days of the careless happy-go-lucky choice by rich women of dresses smartly styled in close simulation of French modes, but executed in cheap fabrics to which even one cleansing is fatal,—these days are over," states Mr. Moss. "Attempts at the correction of piracy evils under such conditions were farcical. Such sobering influences as now prevail bring the buying of dresses down to actual necessities and much pondering over the best possible values for the allotted outlay." In the fight for protection on the designing of prints in particular, Mr. Moss has battled for the artist, the engraver and printer, as well as for the silk



*Mallinson prints (from bottom to top): Printed Pussy Willow, formal pattern; Printed Pussy Willow, naturalistic arrangement of florals; Printed pure dye crepe; Printed indestructible flat chiffon, informal arrangement of a formal pattern.*



*Two knit fabrics from Lombardi Knitcraft, Inc., upper features rabbit hair in woven effect, lower stripe-check. Two other fabrics from Mallinson collection, upper pure dye crepe and lower printed indestructible flat chiffon.*

definite receding of black. All black will have little support. Black relieved by conspicuous color will run well into fall. Black ground sheers will reveal as a trend gathering momentum for late summer formal modes, large, beautifully contrasted, vari-color floral motifs that are new in effect and may prove revolutionary in the American market." Vincent Lombardi, Lombardi Knitcraft, Inc., when asked for views on the influence of novelty yarns in the mid-summer and autumn collections of knitwear, states: "Blendings of fibers which contribute so largely to the popular styling of current novelties will continue. In the knitted branch of costume textiles, novelty yarns remain of great importance. There is no doubt that the practicality of knitted novelties accounts for their enormous vogue at this time, but ingenuity of construction and the unusual color work inspired by the great ateliers abroad, are carrying them along for the seasons ahead as never before. The close parallel of new knitted novelties with woven silks reminds us of the care with which the leading silk manufacturers have included silks of wool appearance in their collections. The oncoming trend toward 100% acetates or acetate mixtures with silk or viscose, can be forecast with certainty; and these changes will strongly influence production in our specific division, just as the woven woolen materials, which for the last two years have absorbed rabbit, angora and ostrich, have enormously influenced the character of novelty knits."

manufacturer. A. L. Courter, director, Traphagen Commercial Textile Studio, New York, and formerly a member of the staff of C. K. Eagle & Co., states a conviction that a color era is dawning such as followed the World War. He adds: "Demand is already changing from the traditional spring grays and beiges, and as we approach mid-summer you will see intense greens, and rusts, new reds of orange and magenta casts, also new blue ranges. The demand for diagonal ombres will increase rapidly with mid-summer sheers and the sports novelties. Vari-color and multi-color stripings and plaidings will be much in evidence. Three-color and two-color contrasts will prevail on high style authority, as of marked fashion importance, in the face of a

From Milgrim's 57th Street vantage point in New York comes the forecast in women's wear of a continuance of a mannish worsted interest dating from last autumn. For present demand a severe type of tailored suit with a cape is quoted as the success of the custom-tailor department. The first of the trouser-ensembles in mannish worsteds, predicted in 1930 by Paul Poiret, as a future American mode, has been presented at Wanamaker's. It was worn on Fifth Avenue within 48 hours thereafter. Apart from the sensational publicity on this development, the "Hollywood world-premiere" of a trouser that has had five years of beach and boudoir pajama precedent, a substantial upholding of the practical significance of worsted suitings will maintain serious interest in these cloths for two seasons at least. Mallinson's, among other silk houses, is printing a series of these worsted plaids on silk and wool mediums.

C. H. Schmidt, a close student of the new worsted developments, reports active interest on the part of leading suit and ensemble manufacturers in the plaid and check patterns and foresees their influence upon early fall suitings. Mr. Schmidt upholds the rough-face, nubbish textures as a coating certainty, remarking the rapidly advancing vogue of a cotton suiting originated

*Moss fabric in cotton suiting, a forecast number for woolen coatings and suitings, according to C. H. Schmidt of C. H. Schmidt & Co. Informal floral print is from collection of Moss & Still.*

by his firm with the eye-value of an English hand-loom woolen. That a reaction in the de luxe coating group will revive formal, smooth-texture soft-hand cloths is also a certainty, in Mr. Schmidt's opinion.

Although the styling of cottons has unquestionably attained new levels, consumer interest is sustained largely because cottons, like silks, so greatly resemble woolens. Rough, nubbish, spongy constructions having the appearance of the finest of English homespun woolens, give to a cotton suiting the importance of the linen tweeds sponsored by Erlanger-Blumgart in herringbones, etc.

A. Mayer, known to the trade as Mayer "Chic," and especially conversant as a model maker who has specialized in cottons over a period of years, predicts a marked advance in the acceptance of the sturdy, homespun, well-designed, well-executed specialty, as distinct from the feminine appeal of organdies, the smart lawns and dimities.

"I am confident the cotton vogue is to have an extension beyond that of any previous year," he said, "because the method by which all silk and woolen textures have been allotted to cottons makes possible important types of coat-suit heretofore unknown to cotton specialties."

Linens have a decided advantage in the fact that their recent creped texture offers almost endless inspiration to the designer of mid-summer sports wear, in medium and higher-priced ranges. In addition, the smart designs offered on handkerchief linen transform that de luxe fabric into a sharp rival of printed silk sheers. Both the new cloqy and mossy cottons and the ingenuity of both the light and heavy-weight linens, carry these products forward into the heart of the style picture until fall.

# *The Smith Plan*

THE textile industry has demonstrated that it is not always negative on farm relief proposals. Many manufacturers have expressed themselves strongly in favor of the bill sponsored by Senators Smith and George.

This proposal is infinitely superior to the domestic allotment plan in that it would not impose an unfair burden upon a great industry, it would not result in decreased consumption of the fiber, and it would not encourage increased planting. All of those objections, and others, apply to the domestic allotment plan.

It is true that, in our opinion, the provision in the Smith bill for reduction of acreage is not easily enforceable but this weakness alone should not be used as an excuse to defeat the measure.

However, one element *should* be corrected. The plan is excellent in that it proposes taking the Farm Board out of the cotton business. This purpose would be defeated if Section 4 of the bill, authorizing the purchase of additional cotton on the open market, were retained in the measure. We hope this will be deleted.

By the time this appears in print, the fate of the Smith bill, insofar as this session of Congress is concerned, will probably have been decided. As we write (Feb. 20) there seems to be a fair chance of its passage. If so, we believe the results will justify the endorsement which many manufacturers have given to the measure.—*Editor.*

ADVERTISING PAGES REMOVED

# Technocratic Blues

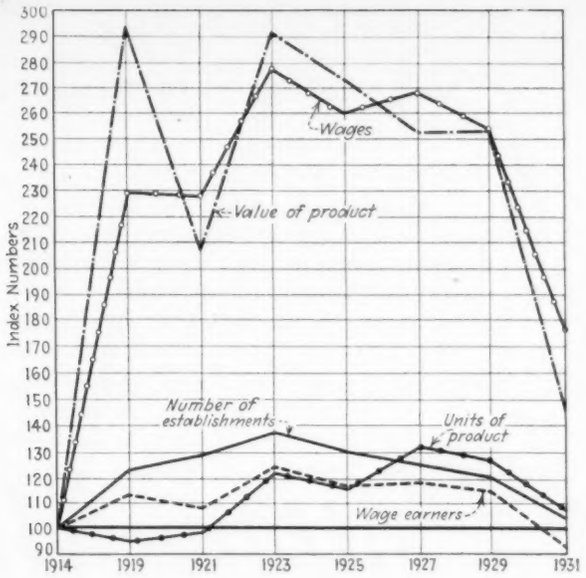
## UNSUNG BY TEXTILE CENSUS

TECHNOCRATIC visions of industries operated largely without benefit of man-power do not seem likely of early fulfillment in textile manufacture. This is one of the principal deductions to be drawn from an analysis of the biennial Censuses of Manufactures during the period 1914-1931. Although the units of product per worker increased over that period, due undoubtedly to technological improvements, this increase was by no means so sharp as that ascribed by technocracy to industry in general; output per worker in 1931 was only 16% greater than in 1914.

In fact, in the face of the world-wide upheaval which occurred during the 17 years under review, the textile industry seems to have been characterized by a degree of relative stability which is rather surprising.

The picture is shown in the accompanying chart, where vital facts from the Censuses of Manufactures have been plotted in relationship to 1914. In other words, using 1914 as a base, 100, the number of establishments, number of wage-earners, wages paid, value of products, and total number of units of product in the four major branches of the industry during each of the succeeding census years have been reduced by TEXTILE WORLD to index numbers. The table below gives the details on which the chart was based.

In three of these items—namely, number of establishments, number of wage-earners, and number of units of product—the maximum divergence from 1914 in any of them was 37%. In the other two items however—namely, total value of products and total wages paid—the maximum divergence from the base year was 193%. The apparently wide variation between the latter two items, on the one hand, and the three mentioned above, on the other, reflects of course the fluctuation in the value of the dollar. In other words, any factors figured in terms of dollars reacted sharply to the inflation and succeeding deflation of the period under study. If value of product and total wages were reduced to terms of purchasing power of the dollar, the two resulting curves would undoubtedly closely follow the other three.




*IN THIS CHART,* the index numbers for the various years are based on 1914 as 100. Totals of number of establishments, number of wage earners, wages paid, value of products, and number of units of product, are from the Census of Manufactures; details are shown in table below. In the case of units of product the major items in the cotton goods, woolen and worsted goods, silk and rayon goods, and knit goods industries have been totaled. Although in knit goods, number of dozen pieces has been used whereas in the other branches number of square yards is included, the totals are suitable for comparative purposes.

### Textile Censuses Since 1914 Summarized

| | 1914 | 1919 | 1921 | 1923 | 1925 | 1927 | 1929 | 1931 |
|---|---|---|---|---|---|---|---|---|
| Establishments | | | | | | | | |
| Cotton goods | 1,179 | 1,288 | 1,328 | 1,375 | 1,366 | 1,347 | 1,281 | 1,136 |
| Woolen and worsted goods | 799 | 852 | 814 | 851 | 832 | 759 | 724 | 621 |
| Silk and rayon goods | 902 | 1,369 | 1,565 | 1,598 | 1,659 | 1,648 | 1,491 | 1,210 |
| Knit goods | 1,622 | 2,050 | 2,078 | 2,323 | 1,987 | 1,869 | 1,888 | 1,675 |
| **Total** | 4,502 | 5,559 | 5,785 | 6,147 | 5,844 | 5,623 | 5,384 | 4,642 |
| Wage Earners | | | | | | | | |
| Cotton goods | 379,366 | 430,966 | 412,058 | 471,503 | 445,184 | 467,596 | 424,916 | 329,279 |
| Woolen and worsted goods | 158,692 | 166,787 | 162,364 | 194,552 | 165,224 | 154,361 | 146,959 | 119,537 |
| Silk and rayon goods | 108,170 | 126,782 | 121,378 | 125,234 | 132,509 | 127,643 | 130,467 | 109,203 |
| Knit goods | 150,520 | 172,572 | 161,880 | 194,244 | 186,668 | 190,283 | 208,488 | 171,524 |
| **Total** | 796,748 | 897,107 | 857,680 | 985,533 | 929,585 | 939,883 | 910,830 | 729,543 |
| Wages | | | | | | | | |
| Cotton goods | $146,129,628 | $355,474,937 | $328,226,744 | $396,602,644 | $353,882,870 | $380,909,543 | $324,289,094 | $219,410,016 |
| Woolen and worsted goods | 75,953,444 | 168,108,681 | 174,894,768 | 222,984,522 | 191,270,791 | 173,821,905 | 164,151,331 | 117,493,102 |
| Silk and rayon goods | 47,108,469 | 108,226,330 | 113,395,626 | 126,849,454 | 142,733,539 | 140,053,588 | 137,547,146 | 97,390,489 |
| Knit goods | 59,758,151 | 125,199,820 | 132,190,349 | 168,271,584 | 168,682,840 | 188,163,458 | 210,714,335 | 145,313,365 |
| **Total** | $328,949,692 | $757,009,768 | $748,707,487 | $914,708,204 | $856,570,040 | $882,948,494 | $836,701,906 | $579,606,972 |
| Value of Products | | | | | | | | |
| Cotton goods | $676,569,115 | $2,125,272,193 | $1,278,220,831 | $1,901,125,703 | $1,714,367,787 | $1,567,400,612 | $1,524,177,087 | $804,420,550 |
| Woolen and worsted goods | 379,474,379 | 1,065,434,072 | 755,583,768 | 1,062,558,438 | 957,790,338 | 817,978,299 | 827,006,348 | 496,242,138 |
| Silk and rayon goods | 254,011,257 | 688,469,523 | 583,418,756 | 761,322,119 | 808,979,399 | 750,123,705 | 731,200,231 | 422,732,585 |
| Knit goods | 258,912,903 | 713,139,689 | 634,073,895 | 848,176,734 | 809,960,213 | 816,620,494 | 899,716,672 | 564,584,158 |
| **Total** | $1,568,967,654 | $4,592,315,477 | $3,251,297,250 | $4,573,182,994 | $4,291,097,737 | $3,952,123,110 | $3,982,100,338 | $2,287,979,431 |
| Units of Product | | | | | | | | |
| Cotton — woven goods, sq.yd. | 6,810,712,349 | 6,317,397,984 | 6,703,835,942 | 8,264,219,579 | 7,741,568,028 | 8,980,414,774 | 8,541,545,733 | 7,140,653,283 |
| Wool — woven goods, sq.yd. | 565,462,159 | 535,937,572 | 493,759,555 | 628,017,509 | 579,788,935 | 550,267,799 | 513,951,168 | 389,831,492 |
| Silk and rayon—broad goods, sq.yd. | 216,033,696 | 310,132,060 | 278,411,105 | 376,221,689 | 483,115,974 | 512,826,739 | 597,113,792 | 566,862,129 |
| Knit goods: | | | | | | | | |
| Hosiery — doz. pair | 75,164,911 | 84,645,757 | 80,240,936 | 97,432,927 | 99,777,406 | 103,166,976 | 111,190,705 | 93,177,155 |
| Shirts and drawers, doz. | 21,758,775 | 17,180,404 | 11,711,624 | 12,746,531 | 11,261,521 | 8,492,497 | 8,801,924 | 7,634,204 |
| Union suits, doz. | 6,272,515 | 9,211,032 | 9,283,748 | 10,745,979 | 11,500,387 | 9,785,906 | 8,891,124 | 6,847,971 |
| Sweaters, doz. | 2,249,142 | 2,132,581 | 2,747,644 | 4,455,096 | 3,714,034 | 3,780,648 | 4,807,422 | 3,989,313 |
| **Total** | 7,697,653,547 | 7,276,637,390 | 7,579,990,554 | 9,393,839,310 | 8,930,726,285 | 10,168,735,339 | 9,786,301,868 | 8,208,995,547 |

## III—Money-Making Methods

*Textile mill technique is not static these days. Each year new equipment appears, new processes are developed. Each year more and more mills find themselves, perforce, entering new fields. The production-manager, the superintendent, and the overseer, find it necessary to keep in touch with new methods. These are outlined, for the several branches of the industry, in the series of articles in this section.*

# Cotton-Mill Efficiency

## BENEFITS FROM BETTER METHODS AND EQUIPMENT

*By Ralph C. Maultsby*
*Southern Editor,* TEXTILE WORLD

COTTON manufacturing in the United States, from the standpoint of labor and machine efficiency, made substantial progress during 1932. The trend toward increased specialization of labor continued, with particular attention to the reduction of direct-labor costs in the weave room, while new high-speed machines with automatic features were developed to reduce mill production costs in several mill processes.

In the early operations attention was focused on the problem of getting more thorough cleaning of stock in the opener room. This was found to be extremely important if satisfactory results were to be obtained with single-process picking. In modern layouts bales are opened as far in advance as possible, the length of time depending upon floor space available in the opener room. This permits the cotton to expand or "bloom" and at the same time allows the operative to feed from a large number of bales a small amount from each bale at a time, thus obtaining a more uniform blend of cotton. Blending feeders and horizontal cleaners have in some instances taken the place of the old bale breakers and vertical openers in the modern opener room.

Introduced last year was a machine, employing the "gyrator" principle, which combines the opening, cleaning, mixing, and conveying of raw cotton. This equipment is built in 10-ft. sections and can be assembled, either horizontal or inclined for conveying purposes, to any desired length.

The change from multiple-process to single-process picking was made in a large number of mills. In many cases, particularly where existing machines were not too old, the desired results were accomplished by the installation of synchronizing change-over equipment. In many other mills the old pickers were replaced by modern machines. An improved positive stop motion for pickers, having the advantage of measuring accurately the desired length of lap, was featured by one builder.

Better control of humidity and temperature in the picker room, made possible by a system of air recirculation that stabilizes the atmosphere, was accomplished in some mills. One machinery builder introduced a recirculating air filter that removes lint and dust from the air. With the use of this equipment dust rooms are abolished and fire hazards greatly reduced.

The oiling of raw stock, which has been widely adopted in the industry, received fresh impetus during 1932 by the development of a new system in which the oil is sprayed on the cotton in the picking process at a point between the upper grid bar and the feed roll in the beater chamber. It is claimed for this method that it permits thorough cleaning of the cotton, as the oil is not applied until after the major cleaning operations. Previous types of equipment for oil spraying were improved and a device was perfected to measure the oil more accurately.

The outstanding new development of the year in card-room machinery was the "controlled-draft" drawing process, which includes two operations—lap winding and drawing. Card slivers are formed into laps, each containing 16 ends of sliver, and weighing 12 to 14 lb., depending upon the roving required. The laps are taken from the lap winder and creeled on the drawing frame, one lap to each delivery, on ratchet-toothed carrier rolls. Each lap contains exactly enough sliver to fill a 12-in. roving can. The controlled-draft drawing process, which uses five pairs of rolls, is said to produce a more even sliver, to give greater production per delivery, and to effect savings in power, labor, and floor space.

Various types of automatic card strippers continued to be installed during 1932. One vacuum type has now been applied to over 38,000 cotton cards.

Among the new devices for testing results in the card room is a sliver tester which can be used for various slivers and coarse roving. The machine accurately gages and records in continuous chart form the evenness of the sliver or roving. One of the principal uses is the comparison of slivers from different cards.

Introduced to this country last year was a roll-spacing determinator. This machine has been designed to permit changing roller settings, drafts, and weights while it is in operation, without need for calculations.

## *Spinning and Twisting*

Perhaps the major development of the year was the application of a new mechanically variable-speed drive to spinning and twisting frames. This arrangement, automatically controlled and easily adjusted to different yarn sizes, is designed to provide uniform tension on the yarn, increase production about 15% by materially increasing the speed as the bobbin fills, eliminate considerable variation in twist, and produce a more even yarn in the spinning process. In the case of constant-speed warp wind the tension on the yarn becomes less as the bobbin builds up, because friction is reduced as the angle between the direction of the traveler and that of the yarn leaving the traveler becomes less—hence the possibility and desirability of increasing the speed of the machine as the operation proceeds. In the case of filling wind, the decrease in yarn ballooning as the bobbin builds up permits similar benefits from gradually increased speed.

The mechanism is ingenious but not complicated. It embodies a ratchet arrangement which lowers the motor slightly at each traverse of the ring rail. The increased tension on the special driving belt caused by the weight of the motor serves to spread the facing cones of the driven pulley on the cylinder shaft and so reduces its effective circumference.

No radical changes in the design of spinning frames were introduced in 1932. There was a tendency to simplify the construction of frames as much as possible and to use higher-quality steels. Many large installations of long-draft to replace old spinning were completed.

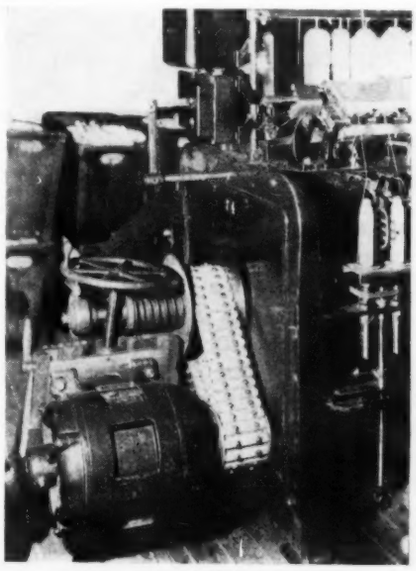
Notable developments in spinning-room accessories were the introduction of more uniform long-draft aprons, said to be free from sponginess and to possess better gripping qualities on the surface in contact with the cotton; a roller-bearing Pitman roll for spinning and twisting frames to overcome lubrication troubles; a spindle base with oil reservior of much greater capacity; an improved portable clearer-board napping machine that cleans the board and renews nap on the felt; an oval-shaped traveler that is intended to reduce friction on the ring and to produce more even tension.

Two entirely new twisters were announced during the year. A novelty twisting frame for a wide range of work, equipped with either duplex or triplex heads, and with each line of rolls having two speeds ahead, was offered. The spacing mechanism is operated by a double-clutch motion for each line of rolls.

The dual-type twister for rayon and fine-cotton yarns, employing the principle of the revolving creel spindle as well as that of the revolving receiving spindle, was an innovation of the past year. This machine, which combines the systems of up-twisting and down-twisting, operates each spindle at 9,000 r.p.m., giving a production equivalent to 18,000 r.p.m. on a single spindle. Advantages claimed for the dual-type frame are high production, uniform twist, avoidance of excessive elongation of rayon in wet twisting, and small floor space. Rayon tints may be added to the water in the trough.

Larger and improved automatic spoolers, with simplified tying mechanisms of heavier construction, were introduced in 1932. The speed of this type of machine has been increased, the knotter being able to tie approximately 85 knots per minute as compared with 72 knots per minute on previous models; and consequently a 180-spindle spooler requires three girls to supply it.

The new "super-speed" warper, which operates at the rate of 900 yd. per minute, was another outstanding mechanical development of the year. The former method of warping from revolving yarn packages is replaced in this machine by an over-end system of warping from stationary packages. The warper runs with practically no tension on the yarn; but when the machine stops, an automatic mechanical device applies tension by means of the drop wires on the creel to prevent kinking of the yarn. The system of creeling is entirely new. Package containers are supported by a chain-and-sprocket mechanism that changes their position when the yarn is about exhausted from packages in warping position. This permits the warper to be creeled while running.



*Variable-speed spinning drive*

An automatic device for leasing ball warps while warper is running was placed on the market during the year. This device, which enables the warper to turn out greater production by eliminating time lost in leasing, may be applied to any type of warping or gassing machine. Another interesting development was an improved skein gassing machine for singeing individual threads where subsequent operations require yarn to be in skein form. Blast-type burners and the use of a suitable air-and-gas-proportioning valve are said to permit singeing at 600 yd. per minute.

Several improvements in automatic temperature controls were brought out by the instrument manufacturers during the year. The need for more uniformly and better-sized warps, particularly in mills which were increasing the number of looms per weaver, resulted in new installations of controls on slashers and size kettles.

New-type looms placed on the market were a shuttle-changing loom for rayon and fine cotton and an automatic loom for weaving duck and other heavy cotton fabrics. The development of an electrical harness warp stop motion that eliminates the need of drop wires attracted considerable attention in 1932. Other weaving accessories of recent introduction were a harness-strap clamp that gives a better adjustment of the harness and jack strap; rubber-cotton lug-strap holders, pickers, parallel blocks, and bumpers; and a steel jacquard doup or leno heddle.

# Woolen and Worsted

## TECHNICAL PICTURE CHANGES STEADILY

*By Edwin D. Fowle*
*Associate Editor,* TEXTILE WORLD

RING spinning in the case of both woolen and worsted continues to be the dominant advance guard in the present march of changed or modernized processes upon the wool industries. Intersecting gilling for Bradford work is a close second. Tape condensing and the modern intermediate feeding for woolen cards have already established such a strong foothold that today they scarcely require mention in a report of technical progress. The same is true of continuous raw-stock drying. Trailing, but still ready and waiting for the recognition it apparently deserves, is the cone over-end system as applied to twisting, to jack spooling, to section beaming, and now at last—as perhaps the most interesting innovation of 1932—to woolen dressing.

Dressing woolen from stationary cones delivering yarn over-end can be done by a dresser tender and a creeler hand at a production rate five or six times that possible on present equipment. Warps ranging from 1- to 4½-run, for example, can be dressed from cones at speeds ranging from 175 to 200 yd. per minute, as against 32 to 48 yd. per minute on the old system; and the efficiency will be considerably higher than the maximum of 60% attained on the latter. The new system is naturally most advantageous where warping is done in volume.

A number of advantages result from the fact that the ends are delivered from individual sources, rather than from groups of 40 to 48 on jack spools. For example, broken ends require only one knot, as an individual end may be pulled forward, thus eliminating the necessity for an extra piecing yarn; and selvage and decorating yarns can be more easily accommodated. Perhaps the most important advantages of the cone system, other than high production, are the mechanical inspection of the yarns during winding, the relieving of yarn strain in dressing, and the maintenance of uniform warp tension.

### *Bradford Ring Spinning*

In the last year or two we have had occasion to point out several times the reasons for the increasing popularity of worsted ring spinning. Although the increased size of package—5 to 6 oz. as compared to 1 to 1½ oz. on the cap warp frame, which means in 32s yarn some 6,000 yd. as against 1,200 yd.—is probably still the most important reason, more emphasis has lately been placed on speeds. It has been shown, for example, that 32s yarn spun on a 2-in. cap at a spindle speed of 7,000 r.p.m. can be spun on a 2-in. ring at between 7,500 and 8,000 r.p.m.; or, to put it another way, the same yarn can be spun at 7,000 r.p.m. on a 2½-in. ring. It has long been conceded that the ring frame is capable of producing a smoother yarn than the cap, but the superior speed capacity of the ring is a relatively new discovery. Rather pathetic was the recent remark of a worsted yarn manufacturer to the effect that, if he had recognized the possibilities of ring spinning a dozen years ago, he would have been a rich man today.

Although the present strong movement toward worsted ring spinning is still young and was first commented upon by TEXTILE WORLD in August, 1931, it is interesting to note that evidence of its approach might have been seen by a student of the subject, if such there had been, for some years previous to the spring of 1931, as indicated by Fig. 1. This chart is based on data in a survey of "The Age and Size of Worsted Spinning Frames and Mules," released by the Wharton School of Finance and Commerce, University of Pennsylvania, on Nov. 12 of that year. It shows the relation of the number of new cap, ring, and flyer spindles installed over a period of about seventeen years to the number of spindles of each type installed before 1915 and still in place in 1931.

The chart discloses that between 1914 and 1925 the percentage of new cap spindles increased at a more rapid rate than that of ring spindles. Between 1925 and

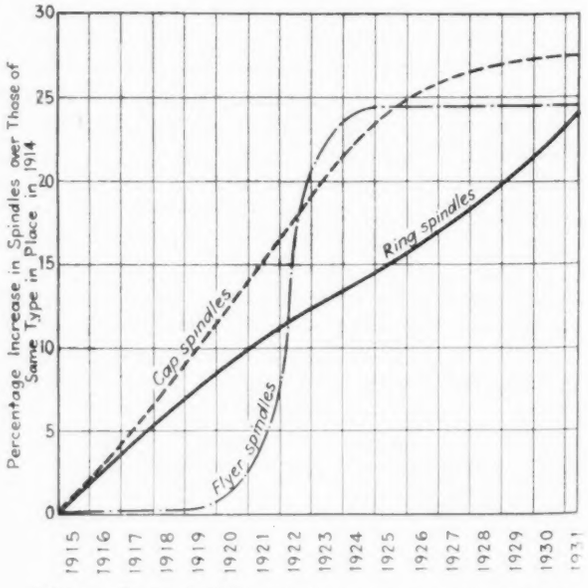



*Fig. 1. Chart showing relative progress of three types of Bradford-worsted spinning between 1914 and the spring of 1931*

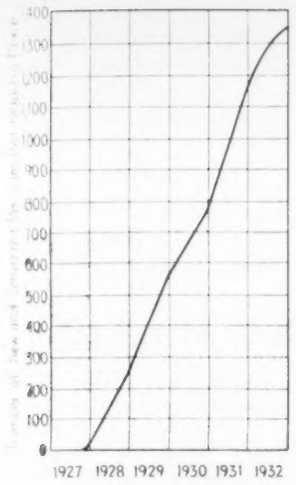



*Fig. 2. Intersecting gill boxes employed by American mills for Bradford work each year since movement started in 1927*

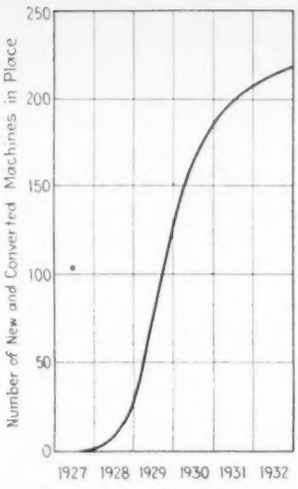



*Fig. 3. Another example of the industry's acceptance of improved machines—a high-production garnett for batting*

the spring of 1931, however, it will be noted that the ring-spindle curve begins to rise and becomes steeper than the cap-spindle curve, the latter showing a distinct tendency to flatten out. It is evident that the two curves are destined to cross. It must be understood, however, that the crossing of these curves will mean only that the percentage of increase of ring spindles since 1914 has passed that of cap spindles. It will by no means signify that there have been more ring spindles than cap spindles installed. The reason for this is that, as already stated, each curve is based on the total number of spindles of the same type in place in 1914 and still in place in 1931. In the case of the cap type this number exceeded 1,000,000 spindles, while in the case of the ring type, it was little over 50,000 spindles.

The prominent increase in flyer spindles between 1918 and 1925 was probably due to one or more particularly large installations, since the total number of spindles involved was small. The important thing about the flyer curve is its absolute flatness between 1924 and the spring of 1931.

Figures on woolen ring spindles have not as yet been assembled, but we know that this development is continuing to grow on the basis of its high production and large packages, as we have pointed out in detail on former occasions. The results of new tests conducted during the year indicate that the strength of ring-spun yarn is about the same as mule-spun yarn, but that yarn uniformity is in favor of the ring frame. A reason which has been advanced for the latter advantage is that in ring spinning true twist is not inserted until the roping has been leveled by drafting; whereas the mule begins twisting before drafting is completed, with the result that the twists run to the finer places. Strength tests on similar fabrics made from the two yarns indicate no choice between them. A napping test failed to show that fabrics made from ring-spun yarn are more subject to damage, as has been contended.

Since one woolen ring bobbin contains sufficient filling yarn for two shuttles, the ring-spinning development is serving to stimulate the practice of rewinding filling. The length of yarn on a filling bobbin can be made an exact multiple of the length on a spinning bobbin; hence the number of knots in the former can be reduced.

In the case of both woolen and worsted spinning, the mechanically variable-speed transmission, which further increases production and improves the uniformity of the yarn, may soon be looked upon with favor—as already seems to be the case in cotton spinning. It is rumored that a new variable-speed (or at least two-speed) a.c. motor will be shortly applied to ring spinning. A comparatively expensive motor of variable-speed qualifications has been available for some time, and variable-speed d.c. motors have been operated successfully by certain worsted spinners for an even longer period.

In connection with winding, a seemingly minor improvement of 1932 has served to change one of the established practices in worsted work. This is a new slub trap which does not break the yarn when a slub or knot is encountered, but stops the yarn with the imperfection at a convenient place for the operator to observe and correct it. Many times this permits a soft waste slub to be removed or a sound and satisfactory knot to be passed without in either case necessitating the breaking of the yarn.

The general trend toward higher speeds in wool manufacture is augmented by the application of ball bearings to the top and bottom of the flyer spindles on dandy finishing, reducing, and roving frames, provision being made for the simple release of the top bearing at doffing time. The large-package idea is being carried into ring twisting by the adoption of the traversing spindle rail combined with traversing ring rail, allowing an 11-in. total traverse and placing 12 oz. of yarn on a double-headed bobbin. Double production is claimed for a new twister recently introduced from England which revolves both the delivering and receiving bobbins, thus inserting twist at two places. A new novelty twister is remarkable for its versatility. Dusters and mixing pickers have been improved for greater production.

One of the developments in worsted carding which, although not new, has been making more rapid progress recently is the use of a burring type of feed end in conjunction with a burring intermediate feed.

## *Weaving Equipment*

Although no important new development appeared in wool weaving during 1932, the year served to show more definitely the soundness of weaving worsteds at high speed on modern automatic looms. The suitability of improved electric warp stop motions was also demonstrated. Some new loom accessories appeared.

And other new methods and equipment which the wool industry has adopted to an increasing extent in recent years seem to belie a rather frequent contention that this field is too rigidly tradition-adhering. Fig. 2 shows the number of intersecting gill boxes operated for Bradford work each year since the development started in 1927. A high-production garnett for making batting is another example on which definite figures are available. Fig. 3 shows the extent to which this machine has been adopted since it was first introduced in 1927; and, although it belongs in a field not a direct part of ordinary wool manufacture (and in fact is by no means confined to wool work), its progress may be an additional indication of the ability of textile mills to appreciate the advantages of modern machinery. Last year nearly three times as many mills applied a new specially hardened wire to garnetts as have applied such wire previously. Incomplete figures show that installations of broad-band intermediate woolen-card feeds have progressed steadily even through the years of the depression and that installations of tape condensers held up remarkably well through at least 1931.

# *Silk Technology...*

## PROGRESS IN THROWING AND WEAVING

◆ *This review of the year's developments in silk work has been prepared by two well-known contributors to* TEXTILE WORLD. *The throwing section is by Warren P. Seem, of Julius Kayser & Co.; and the weaving section is by John Picone, who has recently established a weaving mill in Paterson.*

THE close of 1932 marks the passing of the first year in which all Japanese silk was graded for quality at the Yokohama and Kobe silk-conditioning houses under the control of the Imperial Japanese Government. Thousands of bales were retested and gradings checked with mill operations and quality of fabric. These show a greater uniformity in all qualities. There is evidence that the principle of composite grading is beneficial to the manufacturer and that it should be continued and methods of quality measurements perfected to meet manufacturing requirements.

The evenness results in fabric, however, show wide variations from the seriplane percentage. There is abundant evidence and there are many witnesses to the fact that the seriplane evaluation of evenness is very unreliable. The complaints from the hosiery knitters were so general that the National Association of Hosiery and Underwear Manufacturers appointed a raw-silk committee to study the problem.

The results with the nine-meter method of measuring evenness have been gratifying. A reeling machine and an automatic weighing scale are now being built to reel and weigh the nine-meter sizing quickly and accurately. Now that thrown silk can be graded for evenness, an increased demand for thrown silk so classified is presaged. The United States Testing Co., Inc., announced during the closing months of the year that it was equipped to make such tests.

### *Throwing Machinery*

The outstanding development in throwing machinery is the application of the vertical self-oiling rings and holders to the doubler-twister. These rings make it possible to increase the speeds on doubler-twisters to 7,000 and 10,000 r.p.m. The advantage of the ring and traveler is that the traveler need not be removed to tie up a break, and thus dirty fingers, threads, and knots are avoided. The life of travelers has been increased to 100 hours. They do not bend, thus assuring even traverse. Self-oiling wicks eliminate the greasing by hand, and threads are therefore much cleaner. The adoption of 2-in. double feed rolls enables one to obtain uniform twists up to 20 turns on all sizes of thread.

Improvements in cone winding include slow-starting spindles, improved slub catcher, anti-wear tensions, and gear-gain mechanism for controlling the wind and producing a more uniform cone. New throwing accessories include a Pyrex steaming bobbin for use on silk and rayon, for which cleanness of yarn, lack of rust spots, and flexibility of application are claimed. A variety of stainless steel, aluminum, and Bakelite steaming bobbins have been offered to the trade for use on crepe and hard-twisted yarns. A new instrument measures the yarn tension on warpers and quillers.

The outstanding developments in throwing for hosiery during the year 1932 were made principally to meet requirements for dull yarns and to produce a more uniform and perfect thread for chiffon and sheer numbers. Dullness produced chemically is unsatisfactory, principally because it is not permanent. Permanent dullness is obtained only by highly twisted yarns; and this method increases two-tone defects, streakiness, cleanness defects, and barré.

The principal causes for two-tone have been concretely defined. The precautions taken to prevent excessive losses due to this defect are testing and classifying the raw silk for nature, using silk of like nature and size in leg and foot, avoiding the mixing of skeins from different bales in a lot before soaking, and giving more attention to obtaining uniformity of twist. These measures, however, have only partly eliminated the two-tone effect, and greater care is required in the filature and primary market if this trouble is to be eliminated entirely. The nature test, made on the inclined-plane serigraph, is proving dependable as a measurement of nature and as a guide to the proper treatment in the soaking and disposition of the silk.

The higher twists and darker colors in hosiery cause an excessive number of seconds due to unevenness. To avoid this, increased attention is being given to the proper selection of raw silk for each style. The nine-meter evenness measurement has been introduced into a number of laboratories with gratifying results as far as the reliability of the tests is concerned; but with very disappointing effect on the grade of evenness, as the supply of silk high in evenness is very limited and the demand exceeds the supply.

The higher twists tighten up the cleanness defects and make a clearer stocking. These two conditions cause a greater number of cleanness defects to show in wearing and increase the number of seconds. To reduce the cleanness defects, throwsters have adopted rather extensively the cleaning on the skein and cone winders. Certain filatures reeling the higher grade of raw have almost entirely eliminated the major cleanness defects and are producing a standard for others to follow. The cleanness penalties require adjustment to reward reelers of clean silk.

The demand of the trade for a perfectly clear-knit stocking requires a yarn uniformly hygroscopic and pliable. Higher knitting speeds call for a superior thrown yarn, as the average yarn that was satisfactory with low

speeds does not answer on high speeds. To meet this requirement, various types of soaking machines have been installed in certain plants. It is generally agreed that machine-soaked silk is more uniform than that tub-soaked in a still bath. The results claimed for machine soaking are uniformity of treatment and tint, and a saving in material and time.

[Mr. Seem's contribution is concluded at this point. Mr. Picone's discussion follows.]

## *New Fabrics*

After experiencing an unusually bad season during the early part of 1932, silk weavers began to concentrate on bringing out new constructions and weaves. The result was that every week or so, it seemed, a fabric of different character appeared. Along about the latter part of May and early June the crinkled crepes became prominent, and by the middle of June and into July they were available in a comprehensive range of pure-dye and weighted fabrics. The few mills which were equipped with the looms of 54-in. reed space, necessary for producing this cloth properly, could not turn out the goods fast enough.

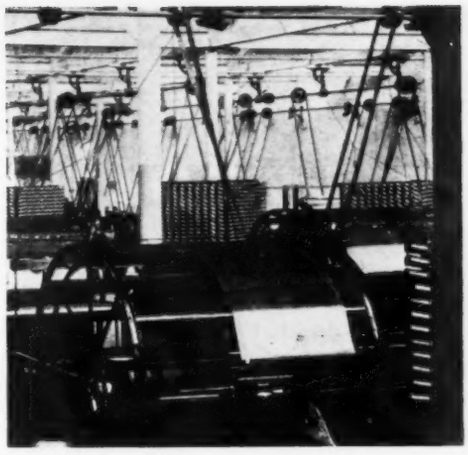
Towards the latter part of July the jericho crepe budded forth and promptly became a nightmare to the fabric technician. He found it a very catchy and difficult material to handle and in many cases burned a considerable amount of midnight oil before he succeeded in attaining the desired effect. The jericho construction was made on six shafts with two shafts for the edges. The warp was arranged as follows: width in reed, 46 in.; reeded 45/3/1; five-thread 20/22-denier Japan with 55/60 turns, two right and two left. The filling consisted of 80 picks of one-end five-thread 20/22 Japan with 55/60 turns, two right and two left.

Next came the sand crepes, made similar to the jerichos but with a 66-end repeat. The silk trade has not taken so kindly to this fabric because it cannot easily be distinguished from the rayon sand crepe. A considerable amount of time has been lost in reeding both silk and rayon sand crepe in an endeavor to enhance the frosty appearance, but it is impossible to obtain the full cross which would pick the ends most satisfactorily for the results wanted. I suggest that at least 50% of the reeding time could be saved by drawing a cord across the length of harness during the entering of the warp. Then, if three ends are drawn above the cord and three below, the ends in reeding will fall out in groups of three, which can easily be chopped into the reeds.

Finally the matelassé rose to prominence and held its own for a considerable time. Many mills have abandoned this fabric, however, for the sole reason that they have not been able to attain adequate production on it. If some of these mills had not lost heart so quickly and had given sufficient study to this fabric, they might have found in many cases that their trouble was due to unsatisfactory temperature in the weave room.

## *Weaving Equipment*

As for silk-weaving equipment, the industry continues to adopt the automatic loom, although at a comparatively moderate rate during the present difficult times. The very fact that under present conditions the trend is still noticeable indicates that appreciation of the automatic loom is still growing and that with a return to more profitable operation the rate at which it was being adopted from 1926 to 1929 will be equalled, if not surpassed.



*New steps have been taken to eliminate static trouble in warping*

The advance of the last year has perhaps not been so much in the installing of entirely new machines as in the improvement and better management of the old. Many mills have had reason to be grateful to those machine builders who have made their new attachments easily applicable to machines already in use.

In recognition of the fact that friction is the basic cause of let-off trouble, a precision automatic let-off was introduced to the trade during the year, this new device employing roller bearings and eliminating all relation between the let-off and the action of whip rolls, links, levers, gears, and ropes. An oscillating dampener prevents extreme oscillation caused by the lifting of the harnesses. The let-off is fully controlled from the front of the loom. Another and less expensive let-off works satisfactorily on a spring-and-leather adjustment.

A new positive and simple intermediate gear-box motion is easily adjusted and kept in time. Another interesting development is a three-finger driving clutch which is controlled by a floating cone collar and is designed to make the driving pressure uniform, eliminate end thrust, and speed up the starting and release.

The life of picker sticks and of the raw-hide pickers has been prolonged by the application of a strip of fiber to the inside and the outside of the picker stick, so mounted as to be adjustable. It has recently been found that bumper straps, cushions, and hold-up straps can be made from discarded automobile tires at a considerable saving. There has been a more extensive adoption of the paperless warp beams with adjustable flanges, as they eliminate the cost of paper and avoid damage due to dirty and defective paper. New types of paperless beams have recently appeared.

In the warping department many manufacturers are giving consideration to the new large creels. A number of installations have been made of a new creel which holds 1,000 bobbins and yet gives the operator a clear vision of the thread. Larger creels than this are available, but the majority of mills find that they do not have the floor space available which such creels require. A new static eliminator applied to the warping of silk and rayon eliminates the flying and curling of warp ends with which many warpers are familiar to their sorrow. Without a static eliminator or proper humidification, it is customary for the warper to keep a damp piece of felt over the warp ends at the creel, an arrangement which is far less satisfactory.

# *Rayon Methods Improved*

## TO MEET HIGHER STANDARDS

PRODUCTION today of yarns and fabrics at lower costs than have hitherto been possible attests to the progress made during the last year by the rayon manufacturers, the textile mills, and the machinery builders. At the same time, quality has been emphasized. Measures have been taken to check the deliberate cheapening of rayon fabrics, a tendency which early in 1931 threatened to end in complete boycott against rayon underwear; and this danger has faded.

Methods for increasing spinning speeds have received particular attention. Recent investigations indicate that the revolving spinneret is impracticable and that the limit of spinning speed with the pot system is apparently about 100 meters per minute. On the other hand, it has been shown that with the bobbin system the practicable speed is about 100% higher than is possible with the pot method. It is reported that equipment suitable for spinning viscose yarn at 200 meters per minute has been designed in Germany. Attainment of this speed has necessitated radical changes in the construction of viscose spinning machines and has called for the use of bobbins larger than those ordinarily employed.

Few developments have been noted in cuprammonium manufacture since the announcement late in 1931 of commercial production of synthetic yarns by the Furness process. In acetate manufacture a number of patents have been granted on dry-stretch spinning methods in which the filaments are passed through the vapor of a solvent or swelling agent and are then stretched while in the swollen state. Demand for low-luster acetate yarns has resulted in the improvement of those spinning processes in which the yarn is spun dull. An acetate yarn with the dyeing properties of viscose is reported from England, and rumors of an artificial wool of cellulose acetate has renewed interest in hollow-filament yarns.

### *Progress in Throwing*

Important in rayon throwing is the trend towards the use of equipment of the silk type rather than of the cotton type. It is now recognized that the use of winders, twisters, warpers, and slashers of the silk type (or designed especially for rayon) results in a better quality of work and a smaller percentage of seconds than obtained with revamped cotton machinery. The need for proper humidification in handling synthetic fibers of all types is better realized than ever before, and it has been found that a relative humidity of about 55% should be maintained in coning and winding departments to prevent undue stretching of vicose yarns.

Within the year more converters, weavers, and knitters have found that, with the possible exception of rayon to be used in high-twist or novelty yarns, first-quality yarn is cheaper in the end than is second-quality. This is particularly true when multi-filament yarns are used, as the individual filaments are finer and more fragile. After dyeing and winding, rayon graded as second or inferior quality gives a multitude of difficulties when further chafed in a warping mill. Winding production is reduced at least 25%, warping production an equal amount, and a poorer grade of fabric is obtained at a lower loom efficiency.

### *New Equipment*

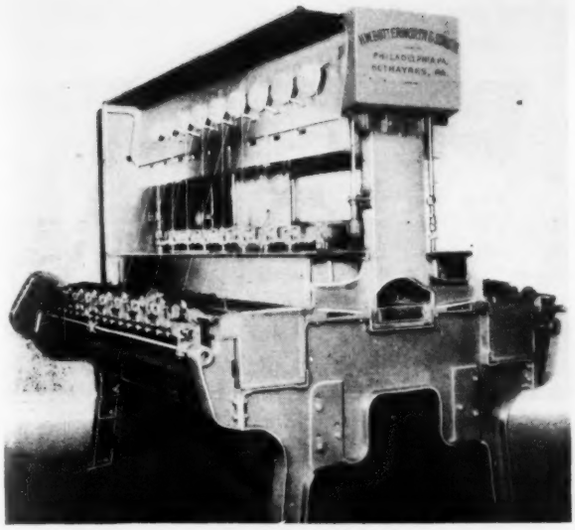
The machinery builder has contributed his bit to the production of better yarns and fabrics at lower costs. For the yarn producer, the most recent development is, perhaps, a rayon pot-spinning machine having a traverse motion said to be five times faster than has hitherto been available. It is said also that with this machine the traverse stroke can be set to give any type of wind desired, such as an open basket wind or one with a helix angle. This in turn permits faster treatment of the "cake" in washing, desulphurizing, bleaching, scouring, and soaping, and obviates skein winding.

Two new doubler-twisters have been brought out in the period under review; one of these machines is equipped with ball-bearing separator rolls and affords a choice of several types of improved feed rolls; the other features large double feed rolls, sliding motor drive, and individually adjustable swing rings.

At least four new twisters have appeared during the year. Two of these are of the dual-type, combining the two systems of twisting—up-twisting, in which the twist is inserted by rotation of the bobbin being unwound; and down-twisting, in which the twist is inserted by the rotation of the bobbin which is being filled. While these two machines vary in the details of their design, both are said to give increased uniformity of twist and to enable 100% greater production than is obtainable on conventional types of frames. One of the outstanding features of another twister is that known as "unit control," which is described as a small, compact, self-contained unit that controls the formation of the finished product through the medium of both twist and traverse. One of the advantages claimed for this arrangement is that the traverse is direct, thus avoiding lost motion and insuring a steady, accurate traverse. A novelty twister, announced early in 1932, and referred to elsewhere in this issue, is suitable also for rayon.

Another of the year's developments is an improved type of coning machine designed to produce a desirable package economically and at high spindle speeds. One feature of this machine is the protection afforded against oil stains; this is effected by the total enclosure of all working parts with the exception of winding spindles, tensions, and driving pulleys. In addition, the gear-gain mechanism is designed to preserve a definite ratio between spindle and camshaft speeds, and thus to prevent any variation in the wind.

A new method for sizing rayon yarn has been an-



*Pot spinning machine with high-speed traverse*

nounced recently and licenses have been granted to machinery manufacturers to make the equipment necessary for the application of the process. In this method the yarn is warped and sized in one operation. The yarn to be treated may be wound on a cheese, or on any type of bobbin. During the sizing process the ends are run from the bobbins or cheeses to the warp beam through the reeds. It is asserted that the process permits the satisfactory sizing even of inferior yarn containing broken filaments and that such yarn can be woven into a good grade of fabric. Separation of individual threads is an important feature of the process. Other advantages cited for the new method are that any weak threads fall out during sizing and their place is taken by new threads which are taken from spare bobbins attached, uneven sizing is obviated, and the yarn is subjected to individual tension throughout the sizing operation.

Other new devices made available in the last year are a new type of static eliminator for application to warping machines and a bevel-edge ring traveler for throwing machinery which is designed to eliminate contact of the yarn with angular edges.

## *Rayon Weaving*

Just as cotton mills are finding it desirable to adopt the silk type of equipment for rayon preparation, so are they coming to realize that weaving equipment of the silk type or, better still, of the type designed specifically for rayon is necessary for the satisfactory production of high-quality rayon fabrics. In the first place, most rayons call for a 52-in. loom width, and the tendency is toward 56- and 58-in. widths; whereas the majority of cotton-dress-goods dobby looms are not over 48½ in. Although cotton looms can be widened, the undertaking is a difficult one, and the results are not entirely satisfactory.

Cotton looms are in general much shorter from front to back than are silk or rayon looms, permitting less elasticity in the warp and causing more strain in shedding. For example, one of the more popular modern cotton looms allows a length of warp behind the breast beam of 36 in., whereas common lengths in silk and rayon are 50 and 54 in. Although the length of cotton looms can be extended by attaching beam stands at the back, the usual width of the beam alley in cotton mills does not often make this practical. Again, silk warps are often run direct from the beam without a whip roll, and here also the ordinary width of the beam alley in cotton mills does not permit pulling up the beam. Cotton looms are too light for much rayon work.

Another problem facing the cotton mills is the relation of the size of the shed to the size of the shuttle. The dobby, common on fancy cotton looms, does not permit holding the shed open to its full width for so long a period as does the head motion more commonly employed on fancy silk looms. Consequently, on a dobby it is necessary for a large shuttle to plow itself into the shed to a certain extent, even when the dobby is made to open the shed to the maximum extent possible. Whereas this plowing is of little consequence in cotton work, it is a serious matter in the weaving of rayon, which is far more susceptible to damage by friction. Although it is true that in the case of silk the shuttles used are considerably smaller than those employed in cotton weaving, the fact than rayon filling is generally much heavier and coarser than silk filling permits an inadequate rayon yardage to be inserted in a silk type of shuttle. Even cutting down the front wall of a large shuttle, as is common practice, fails to overcome adequately the difficulties encountered with a slowly opening dobby shed. Consequently, head motions are desirable for rayon work. Many cotton looms have metal race plates, while silk or rayon race plates are usually covered with billiard-cloth or corduroy.

Cotton men are accustomed and traditionally stand by the type of filling stop motion having the side fork. Rayon looms, however, should be stopped before the reed comes into contact with the goods and makes a mark, which is only possible with a center-fork stop motion. An interesting study recently made on side and center filling stop motions by a prominent loom-manufacturer developed some interesting facts on the relative suitability of these motions for cotton work. A large number of tests failed to show that even once when the break in the filling occurred while the shuttle was traveling from the drop box side of the loom to the plain side, did the side fork succeed in stopping the loom on the first pick. The center fork, on the other hand, succeeded in stopping the loom on the first pick on 95% of the breaks. On the second pick both forks succeeded in making a record of 100%. When the breaks occurred as the shuttle was traveling from the plain to the drop box side of the loom, the side fork failed completely on both the first and second pick, whereas the center fork registered 78% on the first pick, 100% on the second. Naturally, in these tests the center fork was properly adjusted by an experienced loomfixer. The cotton man usually is afraid that a center fork will cause a crimp in his goods, but this will not be the case if the pressure is adjusted correctly.

Special pains have been taken in the design of silk and rayon looms to facilitate accurate joining by the weaver. The loose or spring reed helps to overcome inaccuracies in this matter by giving slightly on the beat-up. On a cotton loom the drive for the take-up is generally on the motor end, while in the case of silk and rayon looms it is on the head end. As it is desirable for the weaver to have one hand on the crankshaft wheel and one hand on the take-up ratchet in making joinings, it is necessary that the automatic-loom magazine be out of his way. Starting up after a loom stop is made easier for the rayon or silk weaver by the common practice of putting a shipper and brake handle on each side of the loom, rather than on only one side, as in the case of cotton. Silk looms ordinarily have much larger take-up drums, and new models have two pressure rollers held against the drum.

Time Studies and Job Standardization
Effect Economies in Dyeing
Chemical Control for Uniform Results
Warp Mercerizing
Latex Compounds
Open New Fields in Textile Fabrication and Finishing
All-Electric Jig
GIVES CONSTANT SPEED AND TENSION
Profits in Printing
ANALYSIS OF METHODS AND POLICIES REDUCES
Finishing-Plant Costs

## HEADLINES TELL STORY OF THE YEAR IN

# *Textile Processing*

DECLINING sales, keen competition, vanishing profits—these are the conditions which the dyer, printer, and finisher have faced during the last twelve months. But the record shows that many companies have steadily forged ahead, have reduced their production costs, and have in many cases increased sales.

Recent advances in textile processing which have enabled certain plants to make money under adverse conditions, and which no company can ignore if it is to remain in business, fall into two major groups. They are: (1) Developments in plant organization and management; and (2) utilization of new or improved processes, products, and equipment which reduce costs or which increase the salability of the finished goods. A few of the many headlines which have told of recent progress are these:

Departmental Analysis Reduces Finishing-Plant Costs
Latex Compounds Open New Fields in Textile Finishing
Chemical Control Gives Uniform Results in Warp Mercerizing
Produces Crease-Resistant Cotton Fabrics
Preshrinking Shows Big Gain
Electric Jig Gives Constant Speed and Tension
Straightaway Tenter Enables Higher Speeds

While the headlines tell the story of recent advances in textile processing, they do not give the full details. Let us, therefore, review briefly some of the more important developments in this field.

Taking first the function of management, we find that a thorough analysis of departmental methods and policies enabled a New England finishing plant to effect savings in direct and indirect labor alone of $79,000 a year, or about 30% of the total annual payroll. Among the changes which were made as a result of this analysis were the following: Installation of belt conveyors in gray-room storehouse; modification of gray-room layout to eliminate needless trucking; establishment of standard bleaching routine; installation of equipment for preheating process water for dyehouse; substitution, wherever possible, of continuous processes for batch methods; standardization of machine speeds; rearrangement of color shop to minimize labor requirements; installation of a bonus system; and setting up of a departmental budget for the guidance of each foreman.

### *Improved Products and Methods*

Turning now to new or improved processes, we find that some of these have effected noteworthy savings in cost; others have enabled the production of a higher quality work; not a few have led to the development of types of finishes hitherto unavailable. Only recently have textile men begun to realize the possibilities offered by latex. Yet already this material is being utilized to produce artificial leather, non-skid rug underlays, double texture fabrics, suede-like materials, etc. Capable of being applied on equipment found in the average finishing plant, latex offers numerous opportunities for the development of new textile products which will bring additional business to the industry. Discovery recently that

the addition of certain types of penetrating agents to latex compounds increases their penetrating powers removes one of the serious obstacles to their use.

Demand for pre-shrunk cotton fabrics steadily increases, and installation of equipment which permits controlled preshrinkage of both warp and finishing has proved to be a profitable investment. A process for rendering cotton or rayon fabrics resistant to creasing or crushing has been widely heralded. Licenses to use this process—which consists essentially of impregnating the goods with a synthetic resin—have been granted to at least two finishers in this country. If crease-resistant fabrics live up to their claims, a number of new markets will be opened to cotton and rayon. Face-to-face starching, a new finishing method, doubles production rate.

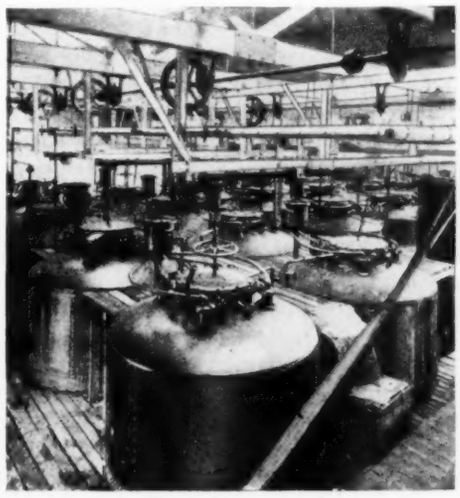
In the field of rayon processing, major developments include the continuous creping and scouring by means of a modified ripple washing machine, the weighting of rayon with insoluble tin salts rendered temporarily soluble or dispersed by the presence of an acid or protective colloid or both, and the microscopic method for controlling the delustering of fabrics containing acetate.

A new method of degumming and dyeing silk by the single-bath process is said to enable marked savings in the cost of degumming agents with no sacrifice in the quality of the finished goods. The procedure recommended makes use of soap in conjunction with denatured alcohol and benzol. Renewed interest in the tin-lead method of weighting followed the announcement last spring that one of the larger dyehouses in the Paterson district had been licensed to process silk under the Berg-Imhoff patents. Advantage cited for the tin-lead process is that it permits incorporation of larger amount of weighting than are possible with the ordinary process.

For scouring textiles of various types, interest has been displayed in the sulphonated fatty alcohols. These compounds form colloidal solutions with pronounced detergent action, do not hydrolyze, and can be employed in acid or alkaline solutions of those with metallic salts.

## *Machinery Developments*

Before we scan the machinery developments of the last twelve months, it may be of interest to make note of the increased demand for some of various types of equipment mentioned in earlier reviews. Sales of one type of silk-soaking machine first offered to the trade in 1931 increased over 100% in 1932; sales of a fulling mill announced three years ago increased 350% in 1931, and 500% in 1932; installations of a continuous carbonizing unit brought out two years ago increased in the ratio of 7 to 1; installations of one type of dye kettle introduced the same year increased in the ratio of 4 to 1. Last year sales of a tenter brought out in 1931 were over double that of the previous year. One model of a hosiery drying machine has steadily increased in popularity; sales in 1931 were 9% and those for 1932 47% over those for 1930. In the last two years some twenty finishing plants have installed Sanforizing equipment of various makes. It is obvious from the record, incomplete as it is, that not a few executives have recognized that installation of up-to-date equipment is a necessity if their plants are to be run on a profit-making basis.



Many of the new types of machinery brought out during the last year offer fully as great opportunities for reducing costs as do those listed above. Let us glance hastily at some of the more striking of the newer developments. One of the most recent of these is the all-electric jig, designed to give constant cloth speed and tension. This jig, which is designed primarily to enable production of finished work of better quauity and at higher speeds than can be obtained with older types, embodies automatic reversing, stopping, and oscillating devices, together with other refinements. Textile equipment manufactured from a corrosion-resisting material produced by combining a selected asbestos base with a modified form of phenol-formaldehyde type of resin, has found wide use in Europe and is now being made available in this country. An improved dyeing machine for silk piece goods has been developed which has a capacity 25% to 50% greater than older models. This equipment is said to enable noteworthy savings in water, steam, and dyestuffs, and at the same time to minimize the danger from chafe marks. For removing excess moisture from yarn which has been dyed in package form, there has appeared a machine consisting of a series of small extractors into which individual extractors are placed. Any number of extractors, each one having its own motor, may be used in a battery. High operating speeds and small floor-space requirements are two of the advantages claimed for an improved tenter recently introduced.

Negotiations are at present under way for the manufacture and sale in this country of textile dryers of unique design. Features of these dryers are a novel method of air circulation and an ingenious manner of conveying the material to be dryed. It is stated that with these dryers thermal efficiency and output are high, and power consumption is low. A cloth washer and a piece dye kettle for woolens and worsteds were among the initial offerings of a company newly organized during the year to manufacture dyeing and finishing equipment.

Many other types of processing equipment have been handliners. They include two new raw stock dyeing machines of cast metal-alloy; three package dyeing machines, including one designed especially for rayon packages; two all-metal dye kettles; a single-apron stock dryer of improved design; a multi-color warp printing machine, and an ager with interesting variations from the conventional design. Among the various types of improved finishing equipment which have been headlined are a continuous shrinking machine for woolens, worsteds, and other materials, another shrinking machine working on the festoon principle; a fully automatic combination brush and shear; a steaming, tentering, and finishing machine for tubular knit-goods finishing; and a conditioning machine which, if desired, can be operated in range with presses or other equipment.

New products displace the old. Rule-of-thumb methods yield to those based on scientific knowledge. Obsolete machines give way to up-to-date equipment. These things the headlines have told.

# *Knitting Ingenuity*

## EVIDENCED BY NEW PRODUCTS OF 1932

◆ *Our data on underwear, outerwear, and circular hosiery have been collected from various sources. For the full-fashioned hosiery review, which forms the latter part of this article, we are indebted to M. C. Miller, well-known authority and author of a series of articles on full-fashioned hosiery machines and their operation now appearing in regular issues of* TEXTILE WORLD.

AMONG the more distinctive knit fabrics of 1932, exclusive of those in the hosiery group, was the Swiss-ribbed material for women's underwear. Many mills have had a long run on this class of goods and are still going strong. Some concerns bought new machines, while others changed old equipment to 13-cut with Swiss-rib-cam arrangement. An exceptionally fine material has been produced on an automatic 20-cut Swiss-rib machine offered to the trade early last spring.

Although the general run of bathing suits did not change radically in style during 1932, a number of freaks appeared, such as those with knitted tops worn with trunks of canvas, felt, flannel, and even many-colored awning-stripe materials. A number of new yarns were introduced to bathing suits last season; and, although the suits looked very well before they were used, many of them came back for refund after they had paid a visit or two to the beach. An exception to the unacceptability of new yarns in the coming season will probably be the case of Lastex.

Although plain knitting continues dominant in coats, pullovers, and sweaters, the inset squares, knitted tight, are being found to have excellent wearing qualities and are well received. This effect is obtained by a chain arrangement which allows the dial needles to hold or cast off certain loops.

An interesting jersey latch-needle machine which will plate a cotton inside a worsted or one color inside another is being used for athletic shirts, coats, and suits. It may prove particularly applicable to lines for football, basket ball, soccer, hockey, and similar sports wear. For polo coats, the new machine will plate a fine worsted over a heavy cotton and stripe in several colors without losing the plate. Any feed or feeds can be thrown out, allowing the use of an entirely different yarn in any plate, as in a beach jacket, where the body is worsted alone and the bottom is composed of six inches of Lastex. The sweat shirt can be made nearly all cotton on this machine by plating a fine worsted on the outside, and again the Lastex can be employed in the roll collar and roll bottom.

A reason why knitted dresses are not more popular today may lie in the impracticability of the slack stitches which result from the necessity of drawing a long stitch when a needle is to hold four, five or six stitches, no matter what pattern-wheel arrangement is used. This is the same difficulty which some bathing-suit manufacturers encountered last year when they attempted to use fancy stitches. Even when some pattern permits a tight stitch, the garments are quite unwearable after a wetting.

Cotton athletic shirts with long, short, or no sleeves, are in good demand today, and sweat shirts with ring or roll necks and long sleeves in cotton and the jumbo worsted are still strong. The children's baseball knitted suits with pullovers to match are encountering serious resistance. With the fabric in bathing suits fast disappearing, it almost seems that there is little left for the knitters but sportwear and the old standard coat sweaters. The coat sweater hangs on year after year with little change, and in fact one mill with only three styles of women's coats has been fairly busy on them for the past six years.

For some time there has been a persistent development in sewing machines for the knit-goods trade toward increasing their production, versatility, and ease of operation. Improvements have been made in the quality of the work and the security of the seams in flimsy fabrics, particularly in the case of rayon. The machines have been made more foolproof. A 1932 example of the latter development is a felling machine which makes the operation more automatic and eliminates the necessity for slowing down when seams are crossed, the feed riding over seams on an endless-crawler principle.

### *Circular Hosiery*

During the last year there has been a continued demand for fancy circular hosiery—to an appreciable extent in women's hosiery, where lace has been prominent; but more particularly in half hose. The circular-machine builders have been of great assistance in meeting this demand by developing new devices to make possible a great variety of fancy patterns. One of the 1932 machines, for example, makes possible three-color work in mesh and reverse-plated effects or in mesh and mock-wrap patterns on reverse-plated fabrics. The wrap-thread mechanisms were also made more versatile—one new machine, for example, permitting 80 individual needle wraps in 80 different colors. Another wrap-stripe machine originally made in eight steps and eight feeds was increased during the year to fourteen steps and eighteen feeds, and the gage in which wraps are used was increased from 54 to 70. Mesh machines were increased from two steps to thirteen steps, and the size range was extended downward from $3\frac{1}{4}$ in. to 2 in.

The circular-machine builders have not confined their activities to increasing design capacity, but have also improved the structure of circular hosiery. One new machine, by inserting some nineteen extra courses above the gore line, produces a square type of heel. By draw-

ing every alternate welt course longer, this machine produces a loose welt having increased elasticity. Split-foot hosiery also underwent improvement, and the range of machine sizes was extended downward from 3½ in. to 2¼ in. There was some progress toward knitting in the float ends during reinforcing.

The circular-hosiery industry has accepted many improved machines introduced in recent years; and some idea of the extent to which this is true is given by the accompanying chart.

Several circular-hosiery mills are producing anti-run stockings. There are three or four in Pennsylvania, one in the Midwest, and two in the South. At least one of these stockings is entitled to be called run-proof. It has a distinct pattern line running horizontally, however; and women who do not care for that particular pattern may be slow to adopt the stocking on its run-proof merits alone. The majority of the other anti-run stockings are not in reality run-proof, although unfortunately they are so advertised. A number are run-proof in one direction, it is true, but they are merely run-resistant in the opposite direction. Since such stockings will run only up the leg, they do to some extent eliminate the most serious result of garter holes, particularly in the case of those consumers who will not refrain from fastening their garters below the welt. A hole in the ankle, or in fact anywhere below the skirt, will result in an upward run which cannot be concealed. Some of the new so-called run-proof stockings make no pretense of being even run-resistant in the welt.

Each mill producing anti-run hosiery claims to have invented its own method and equipment. Several patents have been applied for.

Although the run-resist stocking resembles the plain or staple article more closely than does the run-proof stocking, there is something of a mesh effect in all, with the possible exception of a crepe type. The principle on which most of the new anti-run stockings are based is a combination of float and tuck stitch.

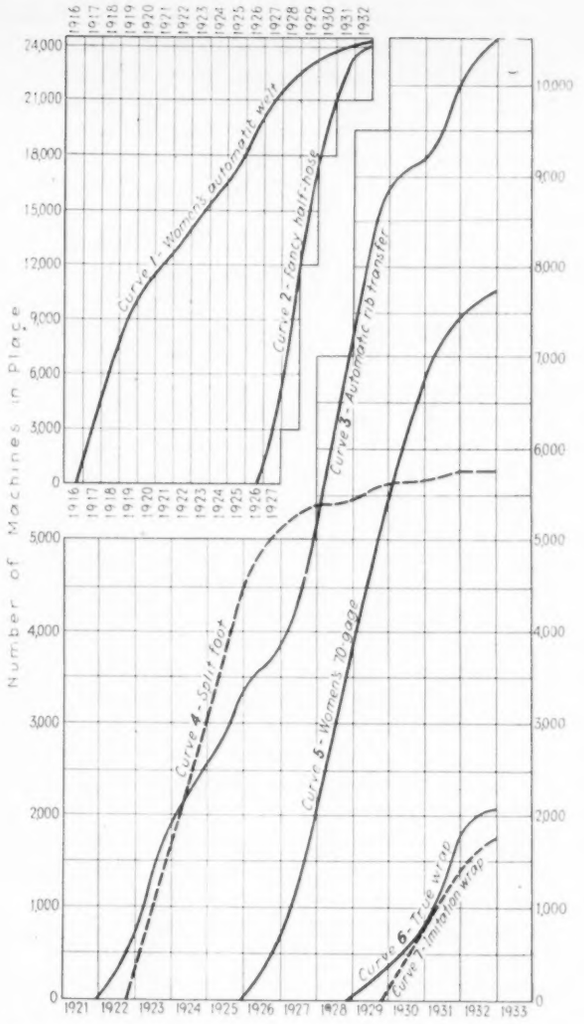
Included in the new auxiliary equipment which appeared during the year is a looper for attaching true ribbed tops to half hosiery, permitting the legs and feet to be knitted continuously in string formation and reducing topping and transferring costs.

## *Full-Fashioned Hosiery*

*Mr. Miller's contribution follows:*

The manufacturers have again shown that the unrestricted, unguided handling of a market requirement can be quickly stifled and made to react unfavorably to all concerned. About two years ago, a few manufacturers cautiously marketed a restricted number of designs of readily producible mesh stockings. The public immediately reacted favorably; and if the manufacturers, through efficient organization, had continued to produce this type of stocking in limited numbers and designs, a profitable market could have been maintained. What happened, however, was that almost all mills commenced producing mesh and then lace in tremendous quantities, many of them producing nothing else.

Those who did this had to invest in attachments, thereby increasing their machine investment. Certain manufacturers, ordinarily conservative, became so enthusiastic that they stated mesh was going to become a staple. Many attempted to market patterns impossible of profitable commercial production on full-fashioned machines, with the result that seconds mounted to a


Number of Machines in Place
Curve 1- Women's automatic welt
Curve 2- Fancy half-hose
Curve 3- Automatic rib transfer
Curve 4- Split foot
Curve 5- Women's 10-gage
Curve 6- True wrap
Curve 7- Imitation wrap

*Curves showing increase year by year in number of circular-hosiery machines of various types in place, including both new and changed-over machines.*

*Curve 1. Women's hosiery machines which automatically turn and knit the welt.*
*Curve 2. Fancy half-hose machines installed since about 1925, including those for reverse plate, float, true wrap, and imitation wrap. (Several thousand horizontal stripers were in place in 1925 and previously.)*
*Curve 3. Men's and minor's hosiery machines which knit a type of rib top, automatically transfer top, and proceed automatically to knit leg and foot.*
*Curve 4. Split-foot half-hose machines. (Tapering-off of latter part of curve is due to fact that split-foot machines are plain type and have had less demand during recent fancies vogue.)*
*Curve 5. Seventy-gage women's hosiery machines.*
*Curve 6. True-wrap machines.*
*Curve 7. Imitation-wrap machines (not including certain float machines sometimes used for this purpose.)*

point where, regardless of price, there was bound to be a loss. In order to keep out of the red, the mills then cheapened their product, allowing hosiery to be sold that obviously was not practical, and caused an unfavorable reaction on the part of the buying public. The result is that today mesh and lace stockings are a drug on the market, with the exception of a very limited demand for certain select brands and practical styles.

While the industry is prone to over-produce designs and novelties, such as mesh, it does not go head over heels into the production of new innovations. This is commendable, as the manufacturers should be very cautious in adapting their machines to new types of hosiery. The full-fashioned stocking has had a form and established appearance for so long a time that any appreciable change in its appearance should be made very cautiously, unless it is quite obviously advantageous.

While a number of the innovations developed in the

past year have merit, they are not of sufficient value to warrant universal use. The sponsors themselves should appreciate that this reluctance to adopt their innovations is desirable; for while a few mills can profitably produce novelties, as soon as the novelty lines become universal, over-production quickly results and the market for them disappears. A brief description of six of these innovations follows:

*Multiple-Picot or Folding Welts.* The original idea was to knit into the fabric, at the top of the stocking, a number of draw-strings to enable the user to shorten permanently the length of the stocking to suit her individual requirements. This did not prove of enough value to warrant its acceptance. From it was evolved the present multiple-picot leg top, the idea being to form picot courses 2 or 3 in. apart below the welt in order that the welt and top of the stocking might be folded at the picots the number of times required to vary the length to suit people of different height. This stocking has been produced extensively by at least one large manufacturer. It has some merit and no disadvantages.

*Single Welts.* The purpose of the single welt is to lessen the cost of knitting welts by eliminating the transfer operation. While the elimination of this relatively costly operation is highly desirable, it is a matter of opinion as to whether the single-fabric welt will be acceptable to the general public. Some of the savings brought about by eliminating the transfer are counteracted by new costs which are added; and it therefore becomes doubtful whether the process is warranted, as the resultant structure is appreciably different from the previously known and long-accepted double welt.

*Foot-and-Leg Hosiery with Mongrel Heels.* The idea of knitting the foot and leg on one machine, as I predicted in this publication about a year ago, has been about abandoned. If mesh had remained marketable for a longer period of time, at least one of the leg-and-foot machines, the product of a German machine builder, would have gone into general use; but without the added attraction of saving the relatively costly and troublesome mesh instep transfer, I do not believe the industry can afford to change over its machinery and thus produce mongrel plain-fabric hosiery, particularly with the present finicky buyers' market. If anti-run hosiery becomes a staple, the foot-and-leg question will be immediately reopened.

*Feather-Edge Selvages.* The idea of producing hosiery with feather edges—that is, with the narrowing marks close to the selvages—is not new. The purpose, which is of value to the manufacturer, is to reduce the number of narrowing points in use and thereby lessen loop-lifting and depositing failures and at the same time place the narrowing marks in the seam, where imperfect, blind, or devil stitches will be prevented from later dropping. The objection to this change is that the stocking no longer has the distinguishing narrowing marks, nor does it retain the continuous wales between the seam and the narrowing marks. As both of these features are very noticeable and are the hallmarks of full-fashioned hosiery, it follows that even if the public reacts favorably to the change, the manufacturers must give serious thought to the value of this distinguishing mark, as by eliminating such features they make more readily possible the production of hosiery simulating full-fashioned on other types of machines.

*Raw Edges.* There have been a few attempts to revive hosiery having non-selvage edges. The idea, of course, is to eliminate narrowings with the resultant costs and the production of seconds, menders, and blind stitches. If these manufacturing troubles could all be eliminated without detracting from the appearance of the finished product, the idea would be highly commendable. As a matter of fact, however, to do so is not all gain for the manufacturer; because, as the mill operators must handle, subsequent to the leg knitting, stockings having raw, loop-dropping edges, perfect seaming becomes more uncertain. There are other minor disadvantages.

From the viewpoint of the buying public, the idea is not sound. The appearance of the stocking is changed and there is liable to be trouble from probable imperfect seaming. I doubt very much whether the savings brought about are warranted and, furthermore, believe that the industry should retain the hallmarks of its product. The loss of the latter alone would nullify any apparent or real advantages.

*Fancy Welts.* The making of fancy or lace welts should be considered a transient novelty and production therefore limited so as to permit almost an instant change-over to plain welts, without loss.

*Anti-Run Fabric.* After every mesh- or lace-style period, attempts are made to retain one of the characteristic advantages of mesh; but the periods are so far apart it is not possible for any individual to remember many of them. The one previous to this was some 25 years ago.

I refer to the very desirable anti-run feature that mesh or lace inherently has—to a degree depending upon the design or pattern. The regrettable fact is that run-prevention in ordinary lace is effective in only one direction. Runs can be stopped from dropping away from the welt-end of the stocking, but not entirely in the other direction.

Because of this characteristic, it is not surprising that after each mesh or lace period certain manufacturers try to evolve anti-run fabric from mesh. This last mesh-style period was no exception in this respect, except that along with it we had an over-produced market which provided an additional incentive to develop a new and desirable stocking. Many types of stockings inaccurately called non-run have been evolved in the past year, but attempts to market them have naturally been abandoned.

There have also been a number of attempts made to develop real non-run hosiery, with considerable success. All such fabrics, in so far as their actual loop formation is concerned, are old. It is the over-all use of such loops that is new, as is the production of such loop structures on full-fashioned machinery.

Three forms have been marketed to some extent. One is composed of spread loops from alternate wales in alternate courses, another has its alternate loops bodily transferred from alternate courses into preceding courses, and another has individual loops, in addition to the regular loops, formed of warp threads.

All of these structures necessarily alter the appearance of plain knitted fabric; but in my estimation, if they can attain the advantages of anti-run, without losing the advantages of knit fabric, other than appearance, they will find a ready and large market. These fabrics would, however, become obsolescent if completely non-run fabric having the appearance of plain fabric were evolved. The latter in my estimation is far away, even though such loop structures are known, for the reason that existing machines cannot form them.

[Since above was written, the single-head machine has been announced. See Feb. 14 issue, page 76.]

# Plant Engineers

## SEEK EVERY MEANS TO REDUCE POWER AND MAINTENANCE COSTS

DURING the last year there have been a number of improvements in power-plant and engineering equipment which permit marked savings in the cost of steam, electric power, maintenance, etc. Plant engineers have been alert to the fact that, regardless of business conditions, no mill should allow its efficiency to become impaired by obsolete machinery or lack of proper upkeep. For these reasons they have advocated the installation of cost-reducing equipment whenever its purchase has been feasible.

### *Power-Plant Improvements*

New boilers are of larger size and for higher steam pressures than formerly. Water-cooled furnace walls for the protection and longer life of the furnace structure are necessary, particularly if pulverized coal is used for fuel. A new development of the year is the so-called "Stub-Tube Wall" in which iron studs are welded to the tubes. Refractory material is then molded onto the studded tubes, thus giving intimate contact of the refractory with the tube surface.

Stokers are being constantly improved to allow better individual control of the different zones of the fuel bed. This is accomplished by controlling the fuel movement and supply to each retort, insuring a graduated distribution of air throughout the fuel mass by varying the size of the tuyere openings, and supplying greater actual tuyere area as compared to retort space and higher combustion ratios with lower air pressures. It is recognized also that the greater in number the air passages in the tuyere block and the thinner the metal webs, the cooler will be the iron, with consequently longer life. This has resulted in the fin type of tuyere which has a greater length of solid metal from the end to the interlocking hole, thus giving more metal to be burned away before the block has to be discarded. Many of the gears of the speed and power boxes are now constructed of steel or bronze to afford greater resistance to breakage when the stoker jams and longer life in general. A new feature of a recent stoker is the square plunger with a renewable liner.

Carborundum, in the form of special air-cooled blocks or as ordinary firebrick, is being used to a greater extent for furnace-wall construction. High-temperature carborundum furnace cements are well adapted either for laying up the carborundum bricks or for facing furnace walls regardless of the type of brick is used. These cements fuse, do not soften under usual furnace conditions, and walls protected with them do not collect the accumulations of slag which extend out into the fuel bed, block the movements of the stoker grates, and prove destructive to furnace walls.

The practice of painting the inside of boiler drums and tubes with a protective coating is gaining in favor, particularly in plants which use a controlled system of feedwater treatment. This protective coating does not stop the precipitation of scale-forming substances, but it does prevent their adherence to and corrosion of the metal. Aluminum paint is coming into more general use as a protective and ornamental coating for power-plant equipment, boiler fronts, flues, and production machinery. Remote control of valves in sizes from 2 to 12 in. and at pressures from 125 to 600 lb. is afforded by a new valve in which a motor-controlled, oil-operated plunger serves to open or close the valve, a spring acting to restore the disk to its original position.

Manufacturers of motors and other electrical equipment have carried on intensive programs of research and development, and many improvements have resulted. In textile mills there are many rooms in which the air is laden with lint, dust, or other foreign matter. Ordinarily this lodges in the windings of the motors, blocks the air passages, and interferes with the proper circulation of the air so necessary for carrying away the heat of operation. The last twelve months has seen the production of the open screenless motor for such locations. The motor is entirely open; the dust-laden air is not excluded but is blown out of the windings by properly located fans attached to the motor shafts. The windings are smooth and glossy, there are no pockets in which the dust can lodge, bearing housings are dust-proof from without and oil-proof from within, there are no screens to catch the dust and require constant attention to keep clean, and hazard of fire is greatly lessened.

With the increased use of the electric drive came the demand for an explosion-proof motor starter for use in locations where explosive or flammable vapors are present, and we find new designs for such use. One a-c., across-the-line starter has all the make-and-break contacts submerged under 6 in. of oil. Other starters are completely inclosed in cast-iron housings so constructed that an internal explosion will not rupture the housing or transmit any flame to the outside. For wet locations we find the splash-proof motor in which all essential parts are protected from condensation and dripping. Stainless alloy has entered the construction of motors for use in moisture-laden rooms or where corrosive fumes may be present. Equipped with two fans and with all vital parts made of stainless alloy, these motors are proof against corrosion.

An important development of the year was the gear motor, which has already found an attractive and useful field of application in the operation of textile machines and equipment. There are numerous machines, particu-

larly in the dyeing and finishing departments, which call for individual motor drives with low speeds. The gear-motor accomplishes the necessary reduction of speed with wide ranges of power and revolutions per minute by means of self-contained, built-in, internal, helical planetary gears, or by some other type of self-contained gear-reduction trains. To quote from the data sheet of one manufacturer, these drives can be had in a-c., polyphase motors up to 75 hp.; a-c., single-phase motors up to 5 hp.; and d-c. motors up to 7½ hp. Shaft speeds can be had as low as 13 r.p.m., ranging from that up to the full-load speed of the motor.

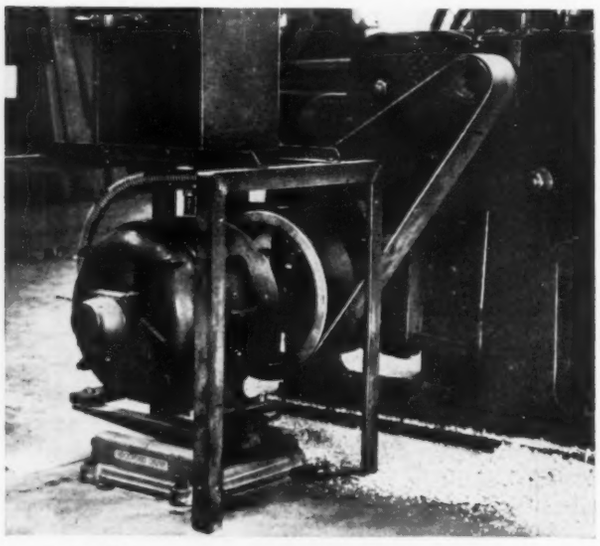
These units can be used for trolley hoists and rail drives, dye kettle and washer drives, calenders, presses, etc. In the power plant they can be used for automatic stoker operation. An additional feature in some makes is that one can obtain the rated speed of the motor on one end of the shaft and reduced speed on the other end.

A distinctive new feature of motor construction is the adjustable-arm motor base for short-center drives by means of which the belt tension can be controlled and the motor adjusted to the most desirable running position. This base is adapted to any type of motor.

For several years past the use of welded steel for fabricating power-plant equipment, such as steam turbines and motor bodies and frames, has been rapidly gaining in favor. A development of the last year which should greatly increase this practice is that of arc-welding sheet and plate parts to steel castings. It is obvious that certain parts of steam turbines and large motors must necessarily be steel castings, and this new method of welding plate and castings together should serve still further to lessen the cost and the time required for the fabrication of such units.

## *Electric-Power Generation*

In the field of electric-power generation we find that the actual costs for the construction and equipping of generating stations and the production of power have decreased. On the other hand the cost of transmitting and distributing the current has increased. Special study is being given, therefore, to the lowering of these two items of ultimate power costs. One of the ideas being considered is that of laying transmission cables underground, as is the European custom. Thermionic tubes of large capacity in their various forms are being developed and tested for use as rectifiers for changing alternating current to direct current and as inverters for the reverse operation. For a long time engineers have visualized the long-distance transmission of high-voltage direct current, and it is hoped that in some form these tubes may eventually be the means of doing this.



*The pivoted motor base, a recent development which avoids excess strains when motor drives must be installed on short centers*

In many textile mills the artificial illumination is far below the standards which have been set up by lighting experts and which in some states have been fixed by law. It is becoming more generally recognized that proper illumination means increased production at less cost, fewer seconds, an improved and more uniform product, and less eye strain for the employee. We find, therefore, that many mills have had their plants systematically surveyed by lighting specialists who have planned new layouts and installed lighting units with modern fixtures, thus bringing the illumination up to the approved standards. It is possible by use of the photo-electric cell automatically to turn the lights on and off when the need arises. The latest development in a lighting unit is the sodium vapor lamp, which produces 2 or 3 candlepower per watt as compared with the tungsten gas-filled lamp at 1 candlepower per watt. This lamp is still in the experimental stage, but at a later date will undoubtedly be an important factor in industrial lighting.

Marked improvements have been made in electrical metering instruments. More attention is being given to keeping a check on the condition of generators and motor insulation by the use of the "megger," or meg-ohm meter. A small "megger" weighing only 3 lb. has been brought out, which should tend to increase the use of this excellent type of instrument. Frequently in textile mills it is desired to know the amount of current flowing in a circuit or to a motor, but operation cannot be suspended while the cable or wire is disconnected for the insertion of a meter. A new ammeter carries a handle on one side and on the other side an attachment, resembling a pair of tongs, operated from the handle. The tongs can be snapped and locked around the cable or wire, and the passing current read on the ammeter scale. Two ranges are available, 0 to 50 and 0 to 200 amperes. This instrument is particularly useful in checking the balance in a three-phase circuit.

Intensive research is being conducted on the properties of various metals for the making of those parts which have to be magnetized on dynamos, motors, and transformers. Magnetizing and de-magnetizing losses in electrical apparatus are very costly, and their reduction and elimination constitute a field of constant study. Silicon steel and cobalt-iron alloys have been developed as magnetic metals, the first for use in motors and transformers, and the second for use in electrical measuring instruments. By the use of silicon steel, the stand-by losses in power and lighting units have been greatly lessened, with consequent saving in fuel costs to producers; and cobalt iron has brought about a much higher efficiency in the measuring of electric currents.

A notable improvement in the fabrication of transmission belting is embodied in a new type of belt in which the duck and rubber plies are built up on a curved surface, rather than on a flat surface as is usual practice. In this way the outer plies farthest from the pulley surface are not disproportionately stretched and stressed in operation as the belt passes over the pulleys. This construction should give longer life to the belt by eliminating the rupture of the outer plies. The same company which developed this belt has brought out a new V-belt in

which there is no inelastic stretch. Advantages cited for belts of the latter type include more uniform flexibility, greater traction, and less side wear than with V-belts of older design.

### *Heating and Humidifying*

Noteworthy advances have been made in supplying fully conditioned air for textile processes, both by means of large central stations or by the smaller unit conditioners. Not only do these various types warm the air and raise the humidity during the winter months, as has been the usual practice for some years, but they are equally efficient in summer for cooling and de-humidifying the supplied air. Cooling is accomplished by passing the air over fin-type coils in which a compressed refrigerant gas is directly expanded or through which a refrigerated brine is circulated. In some types of apparatus the air is washed by a cooled water spray. Small self-contained units complete with motors fitted for circulating either steam or a cooling medium in the coils are particularly useful, since they can be conveniently located as the needs require. Several companies are now supplying equipment for circulating air just under saturation at any desired temperature through housings in which cloth is passed after leaving calenders, rotary presses, etc. The fabrics issue from these housings thoroughly cooled and with the desired moisture content.

Operators having the job of caring for humidifying equipment will welcome an improvement in drosophore nozzles in which a pin actuated by a spring is forced down into the nozzle, opening and thoroughly cleaning it whenever the water is turned off. When the water is again turned on, the pressure created acts on a rubber diaphragm, lifting the pin out of the opening, and a clean nozzle is always to be had.

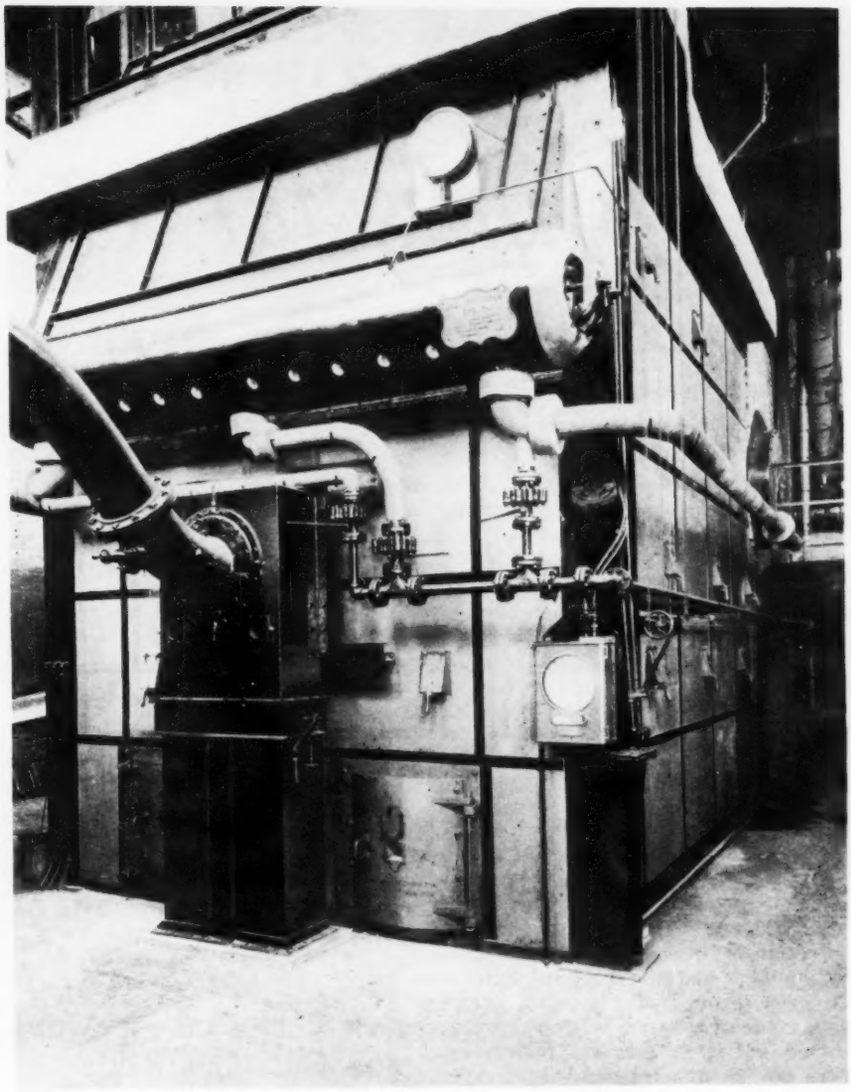
Compressed air has become as necessary in the modern textile mill as is steam or electric power, and let the supply fail for any reason, the resulting protest is instant and emphatic. Too much care cannot be given to the matter of removing the entrained oil and moisture, and we find improvements in the several types of separators for doing this. Supplementing the use of compressed air for general cleaning purposes is a new portable unit of the vacuum-cleaner type with a 10-ft. extension pole for use on overhead shafting, motors, piping, and cables.

### *Corrosion-Resisting Alloys*

In the last year use of chrome-nickel-steels, the so-called 18-8 alloys, has been greatly extended. This is particularly true in the case of dye-kettle bodies and fittings for woolen and worsted plants. Soon after the introduction of these metals for this purpose it was proved that to prevent surface corrosion where the metal had been subjected to high temperatures—as in the drawing of rods, in the hot rolling of sheets, or during welding processes—it was necessary that the surface film be ground or polished off, exposing a new surface to the dye liquors. Once this film is removed, no further corrosion takes place. Early in 1932 one of the leading steel companies brought out a chrome-nickel-steel containing a small amount of titanium, and the claim was made that the titanium prevented carbide precipitation, and in this way has eliminated the tendency toward corrosion.

The chrome-nickel steels have not had the field entirely to themselves however. Dye kettles are now being made of nickel-clad steel. This is made of two sheets—one of steel and the other of pure nickel—which are rolled together to form a unit sheet. Another new alloy being used for dye kettles is of chrome-nickel, with no ferrous metal content. Still another new sheet metal with textile possibilities is a two-ply plate made with a stainless steel on one side and ordinary carbon steel on the other.

It is recognized by all progressive mill managers that, whatever the circumstances, no plant should allow its equipment to become obsolete or its efficiency lowered by lack of proper maintenance. The plants that are carrying-on today are those whose executives have realized the truths just cited. And when the demand for textiles increases, these will be the mills which can supply the goods, and with profit to themselves.



*Boiler unit installed recently in prominent worsted mill already has record of notable savings in fuel costs*

# *Kinks for Overseers*

## CULLED FROM YEAR'S OPERATING EXPERIENCE

*Very much like those lights which are said to be hidden under bushels are the many demonstrations of ingenuity made by superintendents, overseers, and their associated operating executives day by day, year in and year out, in the some 7,000 textile mills of the country. The solution of the countless problems which confront these men calls for intelligence, alertness, perseverance, and courage; and in the aggregate these comparatively minor undertakings represent a vastly important industrial accomplishment. Some of these problems which have come to our attention for one reason or another during the year are discussed in this article.*

### Tear Drops on Rayon Fabric

On the loom a rayon fabric persisted in showing tear drop marks in spite of the fact that various sizings were tried and the sizing machine was run at various speeds. It was found that uneven tension in sizing was at fault, due to the fact that the bobbins were not uniform throughout the creel. Their yarn content was irregular. The warper should see to it that the bobbins are uniform in every possible respect. Similar trouble may result from ends coming off the warping mill in a slack state. Variations in the hardness of the bobbins can be caused by lack of uniform tension in winding.

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### Filing Small Articles

Small articles are difficult to hold when being filed. A mechanic will find the following little kink helpful: Lay one file on the table, place the article to be filed on top of this, and then draw the file which is to do the work over the article with its cutting edge opposite to that of the stationary file. The mechanic will find that by this means he can accomplish the task easily and quickly. J. V. Isley.

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### Shuttle Tension for Rayon

Two of the most popular rayon fabrics of the year, jericho crepe and sand crepe, were woven with a filling of 50-turn crepe twist. It was found that fabrics of this character, like real-silk crepe, are best woven with either the spring tension or the ring tension in the shuttle. If the filling is allowed to have the least bit of slackness, the piece is not satisfactory. Experience showed that an excellent tension could be secured by cutting off the first ring and making use of three rings only. The same fur used in shuttles for silk was found satisfactory for ordinary purposes; but when the twist was wiry, it was necessary to fur the front more heavily.

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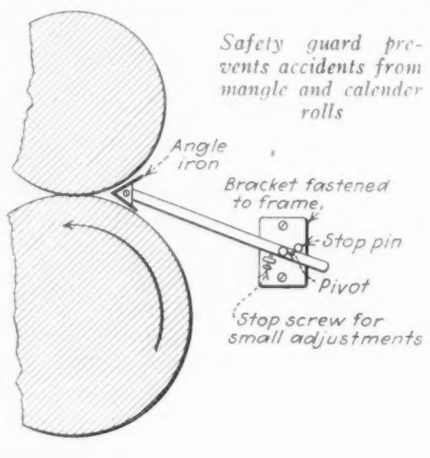
### Safety Device for Mangle and Calender Rolls

Serious accidents from mangle and calender rolls have occurred from time to time in many finishing plants. Therefore a safety device which will prevent such accidents should be of interest. The guard shown in the accompanying illustration has the advantages of being simple in construction, inexpensive, and effective in preventing the operative's hands or clothing from being drawn into the feed side or nip of the rolls. The device does not interfere in any way with the threading up of the cloth or the operation of the machine. In addition, installation of a guard of this type, has in some cases, enabled the mill to obtain a reduction in the rate paid for liability insurance. In most plants the mill mechanical department will be able to do all the work required in the construction and installation of the device.




*Safety guard prevents accidents from mangle and calender rolls*

It will be seen from the sketch that the guard consists of an angle iron fixed to a short lever arm at each end. The lever arms are pivoted to brackets fastened to the frame of the machine. A stop pin prevents the angle iron from falling too low, and a small screw upon which the arm rests affords small adjustments. The angle iron must be at a sufficient distance from the rolls to allow them to be raised when the machine is not in use. The angle iron may be enameled white to prevent rust. In the finishing plant with which the writer is connected a guard of this type has proved most satisfactory and has met with the approval of the safety inspector. F. A. Wright.

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### Storing Hosiery in the Gray

It is frequently necessary for the knitter to store silk hosiery for a considerable length of time before dyeing. If suitable bins are constructed so as to permit free circulation of air, and precautions are taken to have the stockings bone dry before they are put in storage, no difficulties should be encountered. One of the leading hosiery mills which employs the following method has found that the slight amount of oxidation which occurs is not sufficient to give any trouble in the dyeing or finishing operations or to affect the strength of the stockings.

The bins are made from yellow pine slats, 3 in. wide x ¾ in. thick, with nosed edges. These slats are attached about 1½ in. apart to 2 x 4's, slightly chamfered

on the edges where the stock will be exposed, to form bins of the size required. All material is fully sanded before being assembled; fastened with round-head screws; again sanded after being assembled; then finished, first with wood filler, next with orange shellac, and finally with varnish. This construction produces a bin which gives years of service without any further attention.

The bins are built double deck, 46 x 46 x 36 in. high, and four bins long to a section, making eight bins to each section. The bottom of the lower bin is about 12 in. above the floor, and the bottom of the second bin is 36 in. above the first. The bins are portable to facilitate moving when desired. Floors are laid solid of good material and are sanded and finished. The bins are slatted on three sides and half-way up on the front, leaving an opening for putting in and taking out the goods. The goods are laid full length on the floor, and when necessary, are packed reasonably tight. Hosiery frequently is stored in these bins for months at a time.

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## Condition of Wool Tops

Although operating executives are obliged to do a good deal of worrying, it is a question whether some of them do not worry a little too much and fail to put enough reliance on their own resources and ability. An example of this was the case of a worsted mill which had been storing certain tops for three or four months and got the idea that the wool had become gummy, due to improper scouring or unsatisfactory olive-oil emulsion.

An expert was consulted. He examined samples of the tops and washed them with a neutral olive-oil soap. They backwashed excellently, and he expressed the opinion that they were neither gummy nor imperfectly scoured. He found that they had an excellent pull or draw and that there was no tendency of the fibers to adhere together in stringy formation. He ran the samples through an intersecting gill box twice, and the resulting condition was very satisfactory. There was not the least trace of rancidity.

▼

## Flat Places in Silk Fabrics

Some pieces of finished silk fabric made from cable cord appeared to contain flat places at various locations across the goods. The twist was found to be satisfactory and it was finally decided that the trouble was in finishing. It was found that the twist in the flat area had not been penetrated and that therefore the chemicals employed had not been properly blended or a suitable time had not been allowed for the cloth to absorb them. Less haste in processing is frequently found to be the solution for such difficulties.

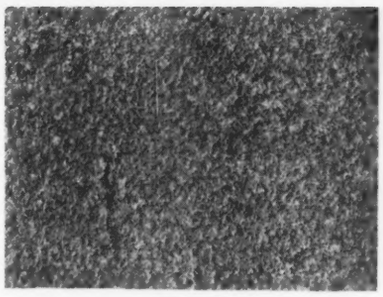

*Fig. 1*

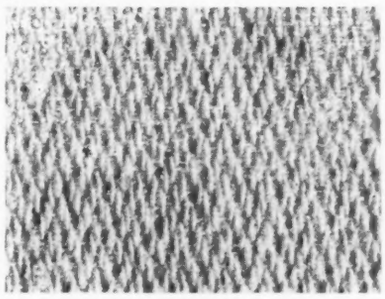

*Fig. 2*

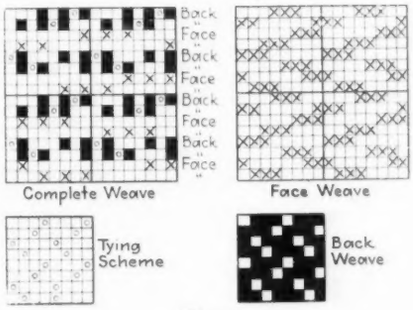


*Fig. 3*

## Woolen Design and Finish

A broken line was appearing at each repeat in a cotton-warp and wool-filling fabric. It was the intention of the mill to duplicate the finished fabric shown in Fig. 1, but it became discouraged when it found difficulty in eliminating the broken line in the unfinished piece, as shown in Fig. 2. The draft used to produce the cloth is shown in Fig. 3.

Investigation disclosed that the weave in the unfinished fabric was the same as in the original and that the streak disappeared in the finished cloth when it was properly handled in the finishing department. The following finishing procedure served the purpose: Fulling, washing, extracting, napping (cutting almost through the pile filling, but not quite), dyeing, extracting, cutting through the pile in napping, drying, cropping on the shear, and light steaming. Cloth of this character does not necessarily have to go on the napper before dyeing; but if the napping is done all at once after dyeing, more stock will be lost. Either a double-acting or single-acting wire napper can be used for the purpose, but it is believed that best results are obtained from the double-acting type.

## Rusty Steaming Bobbins

A silk throwster was somewhat dismayed when he discovered rust on the gudgeons of some steaming bobbins which he had purchased as being all stainless steel.

Beyond the fact that the design of the bobbin was not particularly suitable for setting twist, the bobbins were found to be satisfactory. For testing purposes, they were torn apart, the gudgeons and flanges placed in an atmosphere of 100% relative humidity, and both sprayed with a 5% salt solution for a period of 36 hr. No rust was produced on either the flange or the gudgeon. Nevertheless the original discoloration proved to be iron oxide.

It was finally discovered that the rust originated in the arms of the cast-iron bobbin holders on the throwing frames, and that the gudgeons working in these frames picked up the rust from the cast-iron holders. It is desirable in such cases to clean these cast-iron parts upon which the gudgeons rest by means of wire brushes and emery cloth. Then the metallic surfaces should be coated with a good rust-preventive of a stiff grease-like character and all excessive grease wiped off. This procedure will not only prevent rust on the bearings, but will form a lubricating film between the gudgeon and the bearing, which will allow the bobbin to revolve freely and will greatly improve conditions.

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## Carbonizing With Makeshift Equipment

Continuous carbonizing of woolen fabrics has many advantages over batch methods. In some of the smaller mills, however, the volume of work handled in the last few years has not made it feasible to install continuous carbonizing machines, despite their recognized superiority. The writer has been forced at times to carbonize with makeshift equipment, and in this article will describe a crude method of carbonizing which, although it follows no precedent, gives satisfactory results and shows what can be done under adverse conditions.

There are certain precautions which must be taken if uniform results are to be obtained and damaged fabrics avoided. Thus, the cloth to be carbonized must be clean and free from soap and oil; it should be thoroughly wet out before it enters the acid bath, care being taken to avoid any dry spots; it should remain in the carbonizing solution only long enough to become thoroughly saturated with the acid. Thorough and uniform saturation necessitates the use of squeeze rolls, a suitable penetrating agent, or both.

The goods must be extracted with care; no iron or copper must come in contact with the fabric containing the acid; even if the extractor is lead-lined or painted with a protective coating, it should be lined with a fabric large

enough to cover all parts of the basket. After saturation is complete, the cloth should be extracted to the point of dryness so that no liquid is left to seep from side to side, dried immediately at about 170° F., and baked at 200 to 210°F. Neutralization after crushing should be carefully carried out; a good plan is to wet out thoroughly with cold water; next rinse in a glauber salt bath; and then, if necessary, in an alkaline bath.

To avoid resist spots and dark stains in the dyed fabric, care should be taken also that both the acid and neutralizing solutions are not too strong and that each is thoroughly mixed. To prevent acid holes, make certain that no moisture, such as condensate formed during drying or baking, comes in contact with the fabric between the extracting and neutralizing operations.

The crude method referred to above was an expedient born of necessity. We had some goods to be carbonized, no equipment of any conventional type was available, time was at a premium. Therefore the rake was raised from the last bowl of a wool scouring machine; next a coating of quick-drying, acid-resisting lacquer was applied to the inside of the tank; and sulphuric acid at a concentration of 4 to 5° Bé. and at room temperature was poured into this tank. The cloth was entered at one end of the bowl, submerged and pushed along by hand by operatives wearing rubber gloves, and fed through the squeeze rolls at the delivery end. Finally the fabric was dried in an ordinary wool dryer, care being taken to keep the machine at a speed and temperature which resulted in complete carbonization of the vegetable matter without damage to the wool. While it is not comparable with high-production carbonizing with modern equipment, this expedient gave satisfactory results, and shows what can be done in an emergency. WILLIAM E. HERRICK.

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## Preventing Chafe Marks on Silk Crepe

A defect frequently encountered in silk crepes is that known as chafe marks. Under the microscope fabrics having this fault appear to be properly dyed, but broken fibers are readily apparent. Chafing usually occurs during wet-processing of the goods, often in the dyeing operation. The condition is particularly noticeable on black fabrics, and proportionately hard to cover up. Redyeing may help to a certain extent, but seldom will completely obliterate the marks. In some cases addition of a penetrating agent to the bath in which the goods are redyed helps their appearance. A few simple precautions, however, will minimize the danger from chafing.

Ordinarily silk crepes are dyed in becks. Roughness of the bottom of the becks, the breast rolls, or the reel will cause chafing. The sticks which separate the various strands can also become rough enough to break the fibers and chafe the fabrics. Therefore all wet-processing machines should be inspected at frequent intervals, and roughness of any parts remedied.

Overloading of the machine and use of too short a bath are two other causes of chafe marks. A normal load may be processed satisfactorily, but in the same machine crowding of the goods or running of extra long strands may result in chafing. If equipment is in first-class condition, overloading of machines avoided, and a sufficient volume of liquor employed, there is little likelihood of chafing silk crepes during wet processing. JOHN STERLING.

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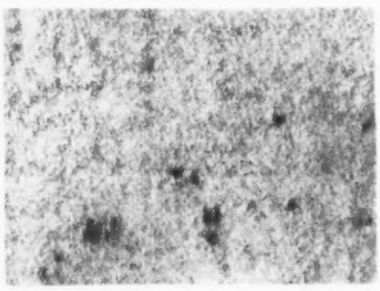
## Making Wool Slugs

A woolen mill had been buying small wool slugs to add to its yarn and give an attractive novelty effect in the fabric. It decided to make its own slugs and found that the following procedure could be satisfactorily employed:

Short, pilly, good-felting wool of fine grade was selected, such as carbonized California or short Texas. This was placed in a dye tub, heavily loaded, and poled steadily while it was boiled for the same length of time as chrome colors. This produced the white slub. The natural boiling of the stock in dyeing produced the color desired. When a harder, more compact slug is wanted, soap and alkali are added to increase the felting, in which case the white slugs are well washed, as the soap tends to turn the slugs yellow on drying and storing.



*Fabric showing use of wool slugs*

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## Stocking Sleazy and Creased

Two problems confronted a full-fashioned hosiery mill recently. Many 42-gage, 8-thread, three-turn stockings were showing sleaze marks, and some were showing bruised stitches. The mill found it difficult to locate the cause of sleazy knitting without a general check-up on conditions in the various processes.

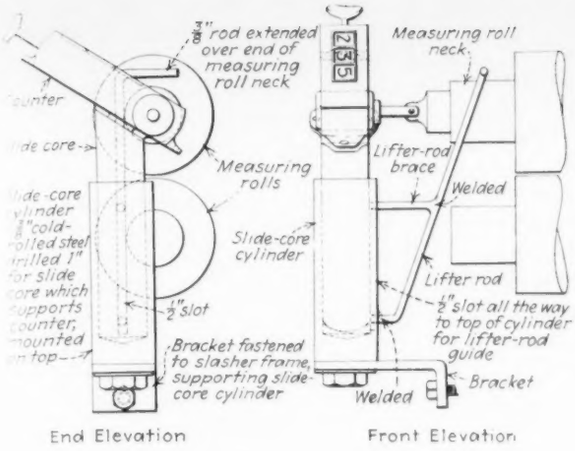
The most general cause of sleazy knitting is dry silk, but it can also result from silk being too wet and becoming partially degummed before it is introduced to the knitting machine. Most of the stockings in the mill in question pointed rather strongly toward degummed silk rather than dry silk, as the sleazy places were very pronounced where they appeared and the distorted stitches ran more at random than uniformly, as would be the case if the silk were too dry. In such cases a careful check-up of the conditioning system is required, and care must be taken to see that the silk receives uniform treatment and arrives at the knitting machine in the proper condition.

The prominent creases or marks noted in this case were what are commonly referred to as water marks. Such creases are very easily produced on goods as heavy as eight-thread by over-crowding them in dye nets or dye machines, extracting too dry, or allowing them to lie around too long after extracting and before boarding. To correct water marks, it is first desirable that the dye nets and dye machines be comfortably loaded, allowing plenty of room for the goods both in the nets and pockets of the dye machine. The dry goods should be entered into a boiling dye bath and the dyeing executed in the shortest time possible commensurate with satisfactory work. After the dyeing operation, it should be seen that the hydro-extractors are not over-crowded with goods and that they are not run too long, leaving at least 60% moisture in the goods. The stockings should be placed on moderately heated boards immediately after extracting, and should be well pulled down in the boarding operation. Water marks on goods that have already been finished can be corrected by re-wetting the goods in a softening bath at around 140° F., the bath to contain 1 to 2% of a good hosiery softener, preferably one with a mineral-oil base. Boarding should then proceed as outlined.

▼

## Filling-Wind Tension for Cotton Spoolers

The application of the disk-tension principle to spoolers for handling filling-wind bobbins has been found desirable and easily capable of accomplishment by the mill mechanic. The bobbin holder, which is shown at *A* in the accompanying sketch, consists of a wood bar extending the length of the machine and containing pins spaced in conformance to the gage of the spindles. It is fastened to the sampsons, and short extensions are provided in order that it may be adjusted at the proper position and at a suitable angle. The guide *B* is adjusted to a position which will steer the yarn off the bobbin with the least friction. The guide is fastened to the spindle rail. The tension takes place at the device *C*, which is made of wood and provided with wires of the proper gage fastened to the wood with staples, the wires serving as bearings for the yarn. The bracket *D* is attached to the guide rod.




*Automatic counter lift for cotton slashers*

An L-shaped hook at *E* is in line with the thread guide on the spooler.

Since the tension device is indirectly fastened to the guide rod, it is continually in motion. It has been found to give the same tension throughout the traverse of the spool and absolutely to prevent the formation of a pear-shaped spool. Spindle speeds must be increased considerably in order that the tension may be obtained without the need for too heavy a disk. With light aluminum disks on very fine yarns, speeds up to 1,350 are used. Experience and observation will serve to determine the weight of the disks and speed required to obtain satisfactory operation and insure a really hard spool. Yarns up to 120s, even if slack twisted, can be handled successfully; and once the proper disks and speeds have been established for a given case, changing from one size of yarn to another is comparatively simple. A range of ten yarn sizes can be accommodated without changing the disks. The cost of rigging up this device is under 15c. per spooler spindle, and the writer has seen its efficiency demonstrated by installations which took care of a production of over 500,000 spindles in some of the finest mills in the country.

ARTHUR OUIMET.

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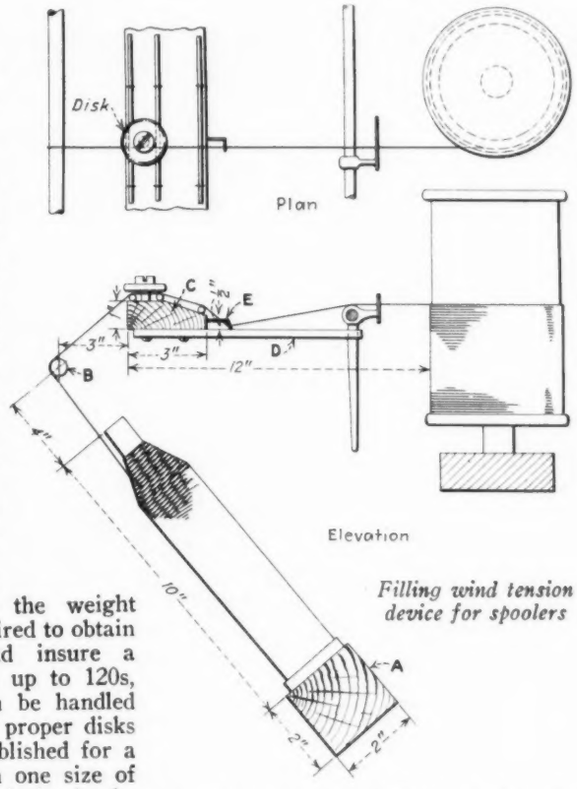
## Lifter for Slasher Counter

Ordinarily a yardage counter direct-connected to one of the press rolls at the front of a slasher is subject to damage when knots pass through the machine. This damage can be avoided by developing an automatic lifter as follows:

Take piece of 1½-in. cold-rolled steel 6 in. long. Turn down one end to ¾ in., thread for a length of 1¼ in., and drill a hole 1 in. in diameter and 6½ in. deep in the other end. Cut a ½-in. slot in one side of the hole all the way to the bottom. This provides a cylinder which is to hold a sliding core.

The sliding core is made from a piece of 1-in. cold-rolled steel 8 in. long. Taper one end as shown in the diagram and weld a strip on the top for a counter bracket. Then take a ⅜-in. cold-rolled steel and bend one end 3 in. at a right angle, so that it will extend over the neck of the measuring roll. Weld




*Filling wind tension device for spoolers*

the other end of this ⅜-in. steel to the bottom of the 1-in. core which holds the bracket, tipping the former out so that it will come over the top of the roll neck. A brace for the lifter rod is made of ⅜-in. steel and welded as illustrated. The cylinder should be greased well, the counter mounted on the sliding core, and the core placed in the cylinder. When the attachment is centered to the roll neck and fastened by means of a bracket to the slasher frame with a ¼-in. clearance between the top of the roll neck and the lifter rod, the counter will rise when the roll rises.

J. V. ISLEY.

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## Socks Are Tendered

Rayon and mercerized cotton socks were giving trouble by breaking out just below the looping closing up the foot of the hose. Investigation showed that the yarn where the breaking occured was considerably weaker than it should have been.

Some of the stockings were knitted with three threads of rayon, of which one or two were colored with vat or sulphur dyes. The tops, heels and toes were knitted with gray mercerized yarn. The completed stockings were dyed with direct colors. A sulphur color was used for certain black stockings, and the polka dots were extracted by a discharge process. Study of all these processes showed that there was no reason why the goods should be weakened at the particular point in question and not at any other part of the stocking, if washing was properly conducted before boarding. By the process of elimination, therefore, it was found that the goods were not washed properly before leaving the dyehouse.

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## Half-Hose Welts Uneven

A half-hose mill was experiencing trouble in getting the top edge of its welts in a straight and regular line. Uneven welts are caused by failure of the fabric to close up at this point. This failure causes the fabric to be dried in a greatly expanded condition, with the result that a trumpet-shaped top is made. In such cases it is desirable to check thoroughly the setting of the stitch cams of the hosiery-top machines to determine whether the trouble lies at that place. There is a rule practiced largely by manufacturers of men's hosiery that the top should stretch 7 in. on being expanded to its full width. This will give plenty of room for the passage of the foot as the hose is being put on by the wearer, and at the same time the top will fit the leg reasonably close in service. There is no advantage in making the welt so that it will stretch more than the body of the top. A welt made tighter than the body of the top will of course be uncomfortable to the wearer.

Irregular welts are frequently caused by use of the wrong type of yarn. A 220-needle half hose should have the top constructed from 36/2, while a 240-needle half hose should have a 40/2 thread in the top. The diameter of the yarn and the stitch settings have a wide influence on the elasticity of the fabric and its ability to close up and fit the hosiery boards snugly. In no case should the top be constructed from two threads, as this tends to reduce the elasticity and will result in a poor-appearing and poor-wearing top.

Irregular edges on the welts of women's hosiery are frequently caused by lack of uniform knitting. If the inside of the welt is knitted with more slack than the outside, it will be difficult to draw the work on the board in such a manner as to avoid puckering. The stitch on the inside of the welt should be slightly shorter than that on the outside, and in no case should the thread on the inside be coarser than the stitch on the outside. If the knitting is properly done, a good boarder should have little trouble in giving the hosiery its proper shape.

## IV—Money-Making Modernization

***Financial stringency can be offered as an excuse for failure to modernize plant and equipment. However, it becomes merely an explanation of failure to make a profit. Manufacturers have no choice; they must make their plans for gradual plant rehabilitation if they are to stay in business. In this section are presented possible savings from modernization, and a few representative case-studies of companies which have gone after those savings.***

### SCRAPPING OBSOLETE TEXTILE MACHINERY WILL

# *Save $159,000,000 a Year*

*By Winn W. Chase*
*Assistant Editor,* TEXTILE WORLD

BASED on 1931 production figures a conservative estimate indicates that improved equipment developed within the last decade will enable the textile industry to make a total saving of $238,000,000 a year. Up-to-date equipment already installed permits a reduction in manufacturing and processing costs of $79,000,000 annually. Scrapping of obsolete equipment still in place will result in a further saving of $159,000,000.

In each branch of the industry certain modernized plants are turning out work at a notably lower cost than is possible with the outmoded machines operated in other mills. Definite knowledge has been lacking, however, as to just how much the installation of modern equipment will save in the manufacturing cost of a pound of yarn or a yard of fabric. An investigation was made, therefore, to obtain that information; and the results are given in the present article.

Data were assembled first showing the conversion costs in 1923 for manufacturing and finishing a number of typical fabrics. These conversion costs include all manufacturing expenses (labor, supervision, power, chemicals, maintenance, depreciation, etc.) with the exception of those for raw materials, such as cotton, wool, and silk. They are not to be regarded as the actual figures from any specific mills, but as representative of the costs ten years ago in well-managed and well-equipped plants.

Next were computed the savings which could be effected by replacing various machines in general use in 1923 with the most modern equipment available at the beginning of this year. In most cases only those savings are included which are made possible by new or improved machines placed on the market within the last ten years. The few exceptions to this rule are in cases where equipment, although available in 1923, was in use at that time in only a comparatively small number of mills. Savings listed are, wherever possible, those shown by actual mill tests; where results of mill tests with old and new equipment were not obtainable, savings have been estimated on the basis of production rates, labor requirements, and other expense factors.

It is important to note that the figures given in the illustrations and tables do not show the exact monetary savings which installation of modern equipment will make possible today. This is due in part to the fact that no savings have been included which have been made possible by modernization of power plants and improvement of electrical and other auxiliary equipment. Primarily, however, it is due to the fact that wage rates now are considerably lower than they were ten years ago. Therefore, these factors must be taken into consideration in calculating the actual savings which can be effected by up-to-date equipment.

Often the installation of a particular type of machine enables savings not only in that department in which it functions, but also in subsequent operations. It

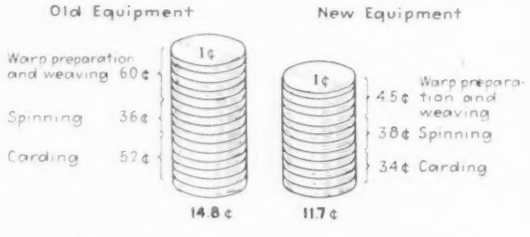


*Fig. 1. Conversion costs per pound in manufacture of cotton sheeting*

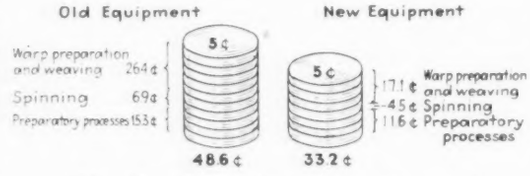


*Fig. 2 Conversion costs per yard in manufacture of woolen dress fabric*

has proved impracticable for the most part to compute the additional savings which accrue from increased over-all efficiency of the plant, reduction in the percentage of seconds, or improved quality of the finished product. For that reason the total savings which use of certain types of up-to-date equipment will effect in the manufacture of the various fabrics to be considered are undoubtedly somewhat higher than are indicated by our figures.

The actual savings which can be made by the use of a given machine in a given mill is dependent on the type and condition of the machine it replaces, the particular material being handled, and several other factors. Likewise different methods of cost accounting will give widely divergent apparent costs for any operation. It is obvious then that the figures given in this article cannot be considered as absolute, fitting all cases; it is believed, however, that they will afford a reasonably accurate guide as to the average savings which can be expected from the installation of the most modern equipment.

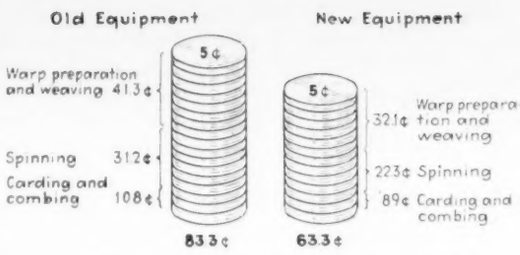


*Fig. 3. Conversion costs per yard in manufacture of worsted suiting*

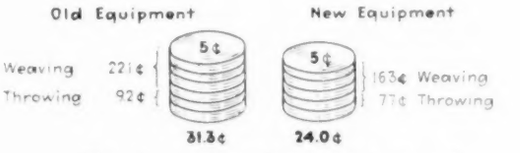


*Fig. 4. Conversion costs per yard in manufacture of typical silk fabric*

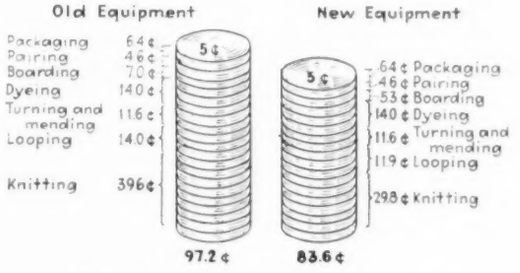


*Fig. 5. Conversion cost per dozen pairs in manufacture of half hose*

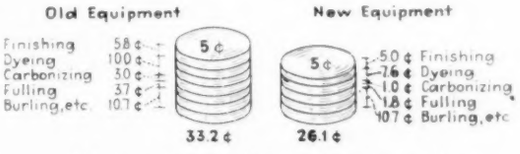


*Fig. 6. Processing cost per yard for dyeing and finishing worsted fabric*

## *Cotton Goods*

In the cotton-manufacturing branch of the industry noteworthy reductions in conversion costs have followed the installation of single-process pickers, long-draft spinning equipment, high-speed warping systems, and improved looms. Automatic card stripping has effected further savings; new combs brought out within the decade have doubled production and cut costs in half; modern high-speed twisters yield net savings of from 20 to 25% or more.

In Fig. 1 is shown graphically the total cost (exclusive of raw cotton) in 1923 for manufacturing a 36-in., 48x 50, 5.50-yd. cotton sheeting; likewise is shown the cost with modern equipment. A more detailed study of cotton-sheeting costs is given in Table I. It will be noted that modern equipment effects a saving in cost of 36% or $0.01815 per pound for roving; a cumulative saving of 18% or $0.01562 per pound for warp yarn, and 14% or $0.01462 per pound for filling yarn; and a total saving of 21% or $0.0057 per yard of cloth. These are the savings which could have been made in 1923 if all modern equipment now on the market had been made available in that year. Today, with lower wage rates in effect, the monetary savings would be somewhat less; the percentage saving, however, would remain approximately the same.

It appears logical to assume that the 21% total saving obtained in the case of the cotton sheeting is a fair average of what can be expected with other cotton fabrics. Assuming this to be true, we estimate on the basis of 1931 production of cotton piece goods (the latest year for which census figures are available) that modernization of those mills which are not equipped with up-to-date machinery would result in an annual saving of at least $60,000,000.

## *Woolens and Worsteds*

It is probable that greater percentage savings are possible in the manufacture of woolens than in any other branch of the textile industry. This is due in part to the fact that replacement of obsolete equipment has been less rapid in woolen mills than in other types of plants, and in part to marked advances made in woolen machinery in the last ten years. Worsted equipment too has been improved in such ways as to increase production, reduce labor requirements, decrease waste, and improve the quality of the fabric.

Among the types of equipment employed by both the woolen and worsted mills which have been greatly improved are included wool washing systems and stock dryers. Equipment combining cone winding and high-speed warping methods has been developed which increases loom efficiency 10% when weaving worsteds; a similar system has recently been applied to woolen manufacture. Automatic looms —employed ten years ago only by a comparatively few mills—are now being used for weaving a variety of wool goods. In woolen spinning modern garnetts have increased production by 50% or more; a combination garnett and card has been designed entirely to eliminate the garnetting process as a separate operation. Blending and picking equipment has been improved; the ceiling condenser and the rotating distributor effect notable economies; a saving of over 50% is not unusual with modern wide cards; both the ring spinning frame and the mule have shown marked improvement.

In worsted spinning improved cards and backwashers effect savings in cost. Recently the Bradford spinners have given serious thought to the advantages of the intersecting gill box; modern ring reducers and rovers permit a one-third increase in production per spindle. Up-to-date spinning frames enable savings in cost of 33 to 50% or more; new twisters cut twisting costs in half.

In Fig. 2 is represented the conversion cost in 1923 for a 55-in., 12-oz., flannel dress fabric; also is shown the reduced cost with modern equipment. From the more detailed information given in Table II it is seen that up-to-date machines enable a saving of 24% or $0.0669 per pound of roping; a cumulative saving of 29% or $0.1134 per pound for warp yarn and 27% or $0.0954 per pound of filling yarn; and a total saving of 32% or $0.1542 per yard of fabric.

In Fig. 3 are shown the conversion costs with old and

new equipment of a 62-in., 12.2-oz. worsted serge. More detailed data given in Table III reveal savings brought about by modern equipment of 17% or $0.0246 per pound of tops; a cumulative saving of 24% or $0.1426 per pound of yarn; and a total saving of 24% or $0.1993 per yard of fabric. As stated before monetary savings are based on 1923 wage levels.

On the same assumption made in the case of cotton goods, we estimate that on the basis of 1931 production the woolen and worsted industry by modernization of equipment would effect an annual saving of $38,000,000.

### *Silk and Rayon*

Improvements made in the last decade in throwing and weaving machinery for silk and rayon permit noteworthy savings in conversion costs. Among the newest types of equipment which contribute to this are silk-soaking machines, modern winders, doubler-twisters, and redraw frames. Up-to-date spinners enable minor savings in spinning; but by producing a more uniform yarn, give intangible savings reflected in the subsequent operations and in the finished product. New redraw frames and quillers speed up production; twisting-in machines cut labor costs. High-speed warpers, slashers developed pa ticularly for sizing the synthetic yarns, automatic looms for silk and rayon all contribute to reduced costs.

Conversion costs in 1923 in manufacturing a typical silk fabric are pictured in Fig. 4; also are shown the lower costs made possible with equipment developed since that time. Further details of the savings effected in manufacturing this georgette crepe are given in Table IV. It will be noted that throwing costs are reduced by 17% or $0.1995 per pound; total weaving costs show savings of 23% or $0.0730 per yard of fabric. Under present conditions, with the percentage reduction remaining the same, the monetary savings would amount to somewhat under that figure.

On the basis of 1931 production, and assuming an average saving of 23% in conversion costs, we compute the total annual saving which would follow the installation of the latest types of silk and rayon throwing and weaving equipment at a minimum of $24,000,000.

### *Knit Goods*

With some notable exceptions, cost-reducing improvements in knitting machinery have, on the whole, been less marked than in equipment employed in other branches of the textile industry. This is particularly true in the case of circular outerwear and underwear machines. There is, however, a tendency towards the use of more feeds per machine, a change which gives increased production and lessens labor, power, and floor-space requirements. On the other hand, there have been a number of improvements in equipment used in finishing knitted undergarments. Examples include an overedging machine which increases production per operative from 25 to 30%; a high-speed buttonholing machine which steps up production about 25%, and at the same time reduces thread consumption; a machine for attaching button stays which gives a 20 to 25% increase in production; and one for attaching cuffs which increases production 25 to 30%.

Improvements in full-fashioned hosiery machines have permitted increases in production ranging from 25 to 40%. Then too, automatic boarding machines brought out prior to 1923, but in general use only for the last ten years, increase production per operator by 66 to 100%, dependent upon type of equipment which they supplant. Two revolutionary developments in full-fashioned knitting—the single-unit machine, and the single-head machine—are so recent that no cost data are obtainable.

Turning to circular-knit hosiery, we find that machinery improvements enable tangible savings in manufacturing costs. Developments in knitting machinery which contribute to these savings are the semi-automatic transfer attachment; the rib-top looper; the inturned, knitted welt machine; and the automatic half-hose machine. Improved loopers have been developed which greatly increase production. The automatic boarding machine has reduced labor costs. Yarn lubricators enable direct savings in needles and supplies and reduce the percentage of second-quality work.

Conversion costs in 1923 for 1 doz. men's circular-knit cotton half hose are compared in Fig. 5 with the lower costs permitted with modern equipment. In Table V it is shown that the saving in knitting amounts to 25% or $0.0981 per dozen pairs; in looping, 15% or $0.0210; in boarding and pressing 25% or $0.0172; and in the total conversion cost 14% or $0.1363 per dozen pairs. At present wage rates the monetary saving would be somewhat lower, the percentage saving remaining constant.

No attempt has been made to compute the savings in the knitting industry as a whole; but based on 1931 production figures, our estimate for the total annual savings which up-to-date equipment would effect in the hosiery industry is $14,000,000.

### *Dyeing and Finishing*

Noteworthy improvements have been made in bleaching, dyeing, and finishing equipment which reduce the cost of processing raw stock, yarn, and woven and knitted fabrics. In addition, use of many of the newer machines results in a finished product of enhanced appearance and handle. Mill tests show that for dyeing raw stock, machines of the closed type enable savings, exclusive of those for dyestuffs, of $0.0025 to $0.0141 per pound. A recently developed skein dyeing machine, when employed for applying vat colors to rayon, cuts labor costs by 50%; those for dyestuffs 25 to 30%; winding costs 60%; and permits economies in steam, water, etc. Use of package-dyeing equipment for cotton yarn results in comparable savings. The efficiency of dryers of various types has been increased, and drying costs reduced.

Recent improvements in drying and finishing equipment for tubular-knit fabrics combine two or more operations in one, and thereby reduce labor costs. Modern silk weighting and dyeing machines increase production and minimize chafing or other damage to the fabrics.

In the cotton-finishing industry, new singers consume less gas; kiers have been greatly improved; and modern jigs and tenters operate at speeds impossible ten years ago. Automatic cloth guiders reduce labor costs. It is probable, however that the greatest savings in finishing cotton piece goods have followed the grouping of machinery in-range. Total savings in processing cotton fabrics which can be effected by equipment improvements in the last ten years will average about 12%. Thus, the total cost for processing a 4.00-yd. cotton broadcloth in 1923 was found to be $0.0046 per yard. Improved machines reduced the cost of singeing and desizing from $0.0067 to $0.005, a saving of 25%; kier boiling and bleaching from $0.0031 to $0.0021, a saving of 32%; dyeing, starching, drying, and framing from $0.0111 to $0.0092, a saving of 17%. The combined saving of $0.0046, or 12%, does not take into consideration the decreased percentage of seconds brought about by the use of modern equipment.

**TABLE I. Conversion cost in 1923 and savings made possible by improved equipment in manufacture of 36-in., 48 x 50, 5.50 cotton sheeting.**

| | Cost per Lb. in 1923 | Savings Effected | Savings in per Cent |
|---|---|---|---|
| Preparatory Processes (4.60 hank) | | | |
| Warehouse | $0.00191 | ..... | .. |
| Opening and picking | 0.00727 | $0.00364 | 50 |
| Carding | 0.01005 | 0.00281 | 28 |
| Drawing | 0.00715 | ..... | .. |
| Slubber | 0.00218 | 0.00100 | 46 |
| Intermediate | 0.00547 | 0.00197 | 37 |
| Speeder | 0.01837 | 0.00873 | 47 |
| Total | $0.05240 | $0.01815 | 36 |
| Spinning Warp (21.5s) | | | |
| Roving | 0.05240 | 0.01815 | 36 |
| Spinning | 0.03167 | 0.00253 | 8* |
| Total | $0.08407 | $0.01562 | 18 |
| Spinning Filling (29.1s) | | | |
| Roving | 0.05240 | 0.01815 | 36 |
| Spinning | 0.05170 | 0.00353 | 8* |
| Total | $0.10410 | $0.01462 | 14 |
| Warp Preparation | | | |
| Yarn | 0.08407 | 0.01562 | 18 |
| Spooling | 0.01215 | 0.00656 | 54 |
| Warping | 0.00273 | 0.00148 | 54 |
| Slashing | 0.00562 | 0.00028 | 5† |
| Drawing and tying | 0.00661 | 0.00463 | 70 |
| Total | $0.11118 | $0.02857 | 26 |
| Weaving | | | |
| Warp (55.43%) | 0.06164 | 0.01585 | 26 |
| Filling (36.00%) | 0.03748 | 0.00563 | 14 |
| Weaving | 0.04920 | 0.00984 | 20 |
| Total | $0.14832 | $0.03132 | 21 |
| Total cost per yard | $0.02697 | | |
| Total savings per yard | 0.0057 | | |

* Increase compensated for by savings in other operations.

† Exclusive of additional savings in weaving

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**TABLE II. Conversion costs in 1923 and savings made possible by improved equipment in manufacture of 55-in., 48 x 26, 12-oz. woolen dress fabric.**

| | Cost per Lb. in 1923 | Savings Effected | Savings in per Cent |
|---|---|---|---|
| Preparatory Processes | | | |
| Sorting | $0.0182 | ..... | .. |
| Willowing | 0.0045 | ..... | .. |
| Scouring | 0.0496 | $0.0248 | 50 |
| Dyeing raw stock | 0.1213 | 0.0134 | 11 |
| Blending and picking | 0.0321 | 0.0056 | 17 |
| Carding | 0.0454 | 0.0231 | 54* |
| Total | $0.2711 | $0.0669 | 24 |
| Spinning Warp (5 run) | | | |
| Roping | 0.2711 | 0.0669 | 24 |
| Spinning | 0.1226 | 0.0465 | 38 |
| Total | $0.3937 | $0.1134 | 29 |
| Spinning Filling (3 run) | | | |
| Roping | 0.2711 | 0.0669 | 29 |
| Spinning | 0.0611 | 0.0232 | 38 |
| Winding | 0.0225 | 0.0053 | 19 |
| Total | $0.3547 | 0.0954 | 27 |
| Warp Preparation | | | |
| Yarn | 0.3937 | 0.1134 | 27 |
| Spooling | 0.0225 | 0.0112 | 50† |
| Dressing | 0.0313 | 0.0157 | 50† |
| Sizing material | 0.0180 | ..... | .. |
| Drawing in | 0.0152 | ..... | .. |
| Total | $0.4807 | $0.1403 | 29 |

| Weaving | Cost per Yd. | Savings | Per Cent |
|---|---|---|---|
| Warp (36.94%) | $0.1332 | $0.0386 | 29 |
| Filling (56.00%) | 0.1489 | 0.0402 | 27 |
| Weaving | 0.2037 | 0.0754 | 37 |
| Total | $0.4858 | $0.1542 | 32 |

* Exclusive of additional savings in subsequent operations.

† Estimated savings effected by recently developed winding and spooling equipment.

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**TABLE III. Conversion cost in 1923 and savings made possible by improved equipment in manufacture of 62-in., 60 x 60, 12.2 oz. worsted suiting fabric.**

| | Cost per Lb. in 1923 | Savings Effected | Savings in per Cent |
|---|---|---|---|
| Preparatory Processes (60s) per lb. | | | |
| Carding | $0.0321 | $0.0089 | 27 |
| Backwashing | 0.0185 | 0.0092 | 50 |
| Gilling | 0.0197 | 0.0065 | 33 |
| Combing | 0.0742 | ..... | .. |
| Total | $0.1445 | $0.0246 | 17 |
| Spinning (2/40s per lb.) | | | |
| Tops (19.66 oz.) | $0.1777 | $0.0246 | 17 |
| Drawing | 0.1323 | 0.0106 | 8 |
| Spinning | 0.1631 | 0.0544 | 33 |
| Twisting | 0.1060 | 0.0530 | 50 |
| Total | $0.5791 | $0.1426 | 24 |

| Warp Preparation, weaving, etc. | Cost per Yd. | Savings | Per Cent |
|---|---|---|---|
| Warp (52%) | $0.2108 | $0.0505 | 24 |
| Filling (48%) | 0.2072 | 0.0496 | 24 |
| Winding filling | 0.0142 | 0.0027 | 19 |
| Spooling warp | 0.0243 | .....* | ..* |
| Dressing | 0.0311 | .....* | ..* |
| Weaving | 0.3449 | 0.0965 | 25 |
| Total | $0.8325 | $0.1993 | 24 |

* Exclusive of savings effected in weaving by use of recently developed winding and spooling equipment.

**TABLE IV. Conversion cost in 1923 and savings made possible by improved equipment in manufacture of 48-in. 80 x 80, 1.259 oz., two-thread, 13/15. Japan-silk georgette crepe.**

| | Cost per Lb. in 1923 | Savings Effected | Savings in per Cent |
|---|---|---|---|
| Throwing | | | |
| Receiving and soaking | $0.0396 | $0.0139 | 35 |
| Winding | 0.2712 | 0.0527 | 19 |
| Doubling-twisting | 0.2951 | 0.0738 | 25 |
| Spinning | 0.2641 | .....* | ..* |
| Redrawing | 0.2849 | 0.0570 | 20 |
| Setting twist | 0.0146 | 0.0021 | 14 |
| Inspecting | 0.0072 | ..... | .. |
| Total | $1.1767 | $0.1995 | 17 |

| Weaving | Cost per Yd. | Savings | Per Cent |
|---|---|---|---|
| Throwing | $0.0924 | $0.0157 | 17 |
| Quilling | 0.0110 | 0.0033 | 21 |
| Twisting in | 0.0049 | 0.0026 | 54 |
| Warping | 0.0198 | 0.0079 | 40 |
| Weaving | 0.1828 | 0.0435 | 24 |
| Inspecting; packing | 0.0025 | ..... | .. |
| Total | $0.3134 | $0.0730 | 23 |

* Exclusive of savings in subsequent processes.

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**TABLE V. Conversion costs in 1923 and savings made possible by improved equipment in manufacture of men's circular-knit, cotton half hose.**

| | Cost per Dozen in 1923 | Savings Effected | Savings in per Cent |
|---|---|---|---|
| Operation | | | |
| Knitting | $0.3963 | $0.0981 | 25 |
| Looping | 0.1398 | 0.0210 | 15 |
| Turning and mending | 0.1166 | ..... | .. |
| Dyeing | 0.1398 | ..... | .. |
| Boarding and pressing | 0.0699 | 0.0172 | 25 |
| Pairing | 0.0466 | ..... | .. |
| Packaging | 0.0635 | ..... | .. |
| Total | $0.9725 | $0.1363 | 14 |

●

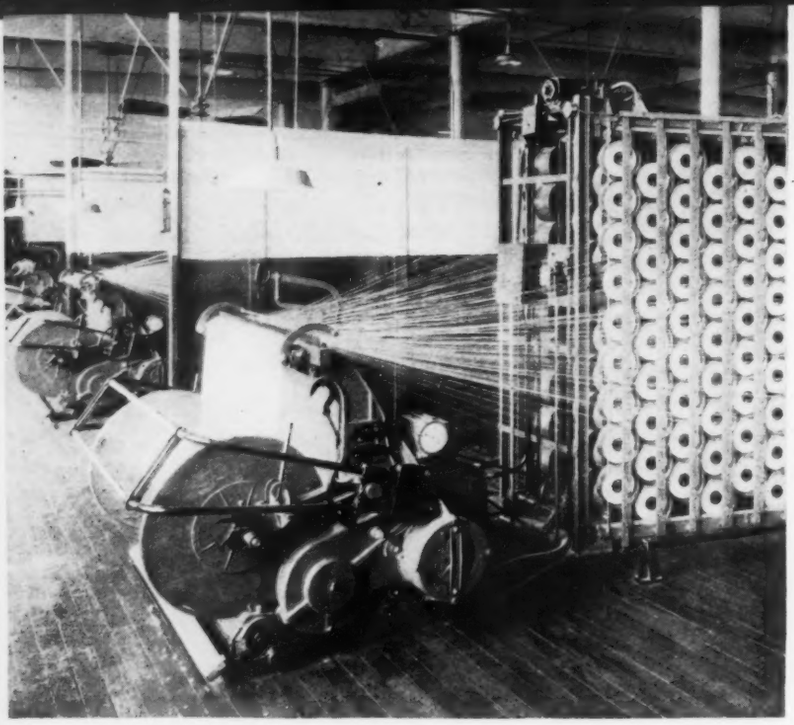
**TABLE VI. Cost in 1923 and saving made possible by improved equipment in dyeing and finishing 12-oz. worsted Thibet.**

| | Cost per Yd. in 1923 | Savings Effected | Savings per Cent |
|---|---|---|---|
| Operation | | | |
| Burling | $0.0413 | ..... | .. |
| Mending | 0.0521 | ..... | .. |
| Gigging | 0.0135 | ..... | .. |
| Fulling and washing | 0.0366 | $0.0183 | 50 |
| Carbonising | 0.0304 | 0.0209 | 69 |
| Dyeing | 0.0997 | 0.0239 | 24 |
| Tentering and drying | 0.0102 | 0.0046 | 45 |
| Finishing | 0.0264 | 0.0026 | 10 |
| Inspecting; packing | 0.0214 | ..... | .. |
| Total | $0.3316 | $0.0703 | 21 |

Recently developed fulling mills and washers; continuous carbonizing machines; improved dye kettles; new decatizing machines; and modern tentering, drying, and conditioning equipment enable savings of 21% in the cost of processing woolens and worsteds. In Fig. 6 is shown the cost in 1923 for dyeing and finishing a 12-oz. worsted fabric; also is shown the cost with equipment now avaliable. From the more detailed analysis of these costs shown in Table VI it will be seen that there is a saving of 50% or $0.0183 per yard in fulling and washing; 69% or $0.0209 per yard in carbonizing; 24% or $0.0239 in the dyeing operation; 45% or $0.0046 per yard in tentering and drying; 10% or $0.0026 per yard in dry finishing; and a total saving in processing costs of 21%, or $0.0703 per yard. As was true in the manufacturing operations, the monetary savings possible at today's wage levels are somewhat lower, but the percentage saving is not greatly disturbed.

Our estimate for the total annual savings which can be effected by the installation of up-to-date equipment for processing all types of woven fabrics, including those dyed and finished by the manufacturer, but exclusive of yarns and knit goods, is $23,000,000.

The replacement value of all equipment in place today for the manufacture and processing of textiles (other than braids, small wares, and miscellaneous products) is in the neighborhood of $1,400,000,000. The value of new equipment (exclusive of repairs, parts, attachments, and accessories) installed in the last ten years is in round numbers $550,000,000, or an average of $55,000,000 annually. This means that some 60% of the textile equipment in place is over ten years old. In general, the older the machine the less efficient it is compared with the most modern type. As a rule, therefore, greater savings can be effected by replacing a machine which is twenty years old than by replacing one which is ten years old. This being true, it is apparent that we have been conservative in estimating the annual burden of obsolete equipment at $159,000,000. Be that as it may, it is certain that those mills which have not yet installed up-to-date equipment must do so if they are to remain in competition with modernized plants having 20 to 30% lower operating costs.



*New "super-speed" warpers in Bevelle plant of Avondale Mills, Alexander City, Ala.—Photo courtesy Barber-Colman Co.*



# Costs

IN order to place its manufacturing operations upon a more efficient basis, and at the same time to increase the number and quality of its products, Avondale Mills initiated an extensive modernization program about two years ago. Since that time machinery replacements and other plant improvements, involving the expenditure of more than $500,000, have been made in the various units of the Avondale group. This progressive company, which was organized by the late Governor B. B. Comer in 1897, has grown from the original plant at Birmingham into the largest textile enterprise in Alabama, operating 10 mills with combined equipment of 275,000 spindles and 4,300 looms.

Early in 1931, when it became increasingly evident that severe price competition growing out of the depression was making necessary further reductions in manufacturing costs, the company decided to begin its program of machinery modernization by revamping all opening and picker-room equipment. This was followed by the installation of automatic spooling and high speed warping in several plants, the replacement of obsolete spinning with modern long-draft frames, and the modernization of indigo-dyeing equipment at Sylacauga and Pell City.

Opening rooms have been revamped in several plants to obtain more thorough cleaning of the cotton before it passes to the pickers. In the central plant, for instance, an upstroke beater and a horizontal cleaner, and also a modern H. & B. cleaning trunk, have been added to the layout. Likewise a new Whitin cleaning trunk has been installed in the opening room of the Eva Jane plant.

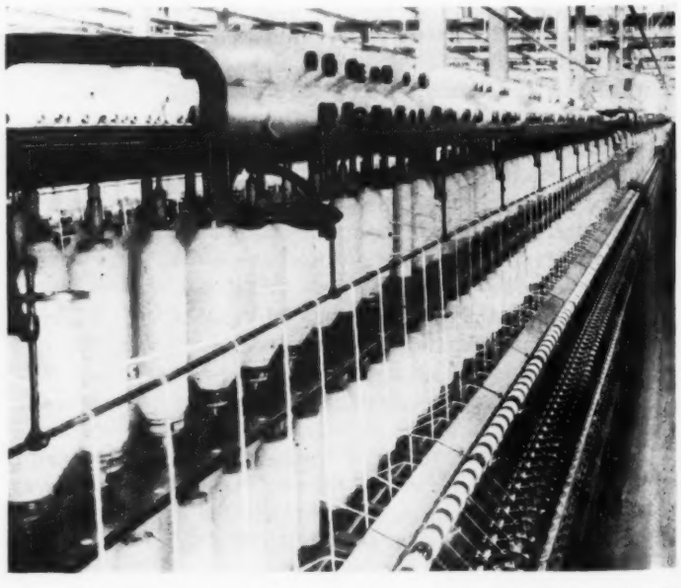
Picker-room equipment has been converted from three-process to single-process by means of the Aldrich system in practically every unit of the Avondale group. Rake-type distributors have been installed over the lines of picker hoppers in the Bevelle, Sylacauga and Pell City plants. Improved positive let-off devices have replaced the old type stop-motions on pickers. Humidifier controls have been installed in the central plant picker room.

Changes in the card rooms have been confined very largely to the elimination of fly frames made possible by the installation of long-draft spinning. In the Eva Jane mill, however, with considerable expansion and diversification of products being made, it has been necessary to install 18 new cards. The card room of the central plant, the original sales-yarn producing unit at Sylacauga, has been completely equipped with cork rolls.

Approximately 100,000 spindles of new long-draft spinning, or long-draft change-over attachments, have been installed. At the Catherine plant, which was built new in 1919, 20,000 spindles were converted to the Whitin-Casablanca long-draft system. Spinning in the Eva Jane plant, consisting of about 55,000 spindles originally installed in 1914, was also changed over to Whitin-Casablanca long-draft. At the Sycamore plant, devoted to the production of carded hosiery yarns, 2,000 spindles of new Saco-Lowell (Roth) long-draft spinning have been installed. All warp spinning in the Pell City plant, originally installed in 1902, has been replaced by 16,080 spindles of new Whitin-Casablanca long-draft. This unit makes denims exclusively. It was found practicable to recondition some of the spinning frames that were replaced by long-draft and to transfer them to other plants.

Considerable improvement in the quality of the yarn, in addition to the important feature of providing better working conditions for the operatives, may be attributed to the modern installation of Firth-Smith "bunchless" automatic cleaners in the various plants. This equipment has been placed over the spinning in the Bovelle, Eva Jane, Sally B. and Pell City plants; over the spinning twisting and winding in the Catherine plant; and over the roving, spinning and winding in the Sycamore plant.

The replacement of old spooling and warping has been responsible for greater efficiency and lower manufacturing costs in several plants. At the Bevelle plant, in which 15s and 18s constitute the bulk of the warp yarn, three 180-spindle Barber-Colman automatic spoolers replaced



*Spinning room in Pell City plant of Avondale Mills, showing*

# *Reduced*

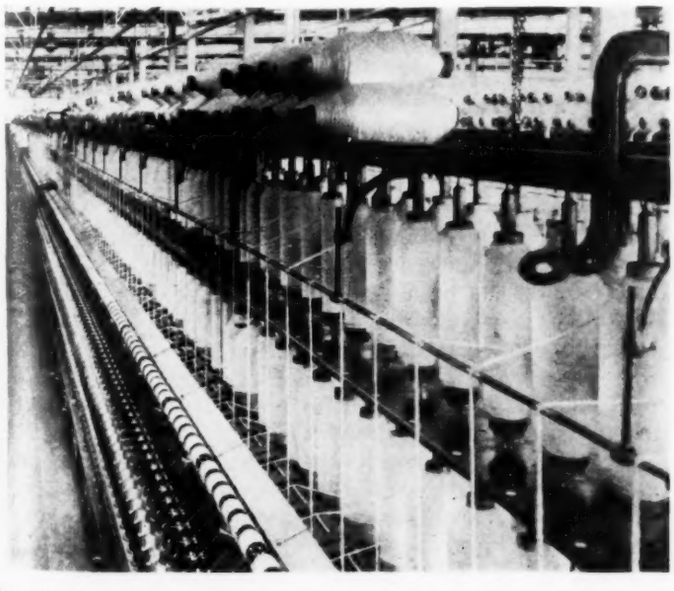
## BY $500,000 PROGRAM AT AVONDALE MILLS

six old-type 100-spindle spoolers and three cone winders of about 90 spindles each. Three new Barber-Colman "Super-Speed" warpers supplanted 12 slow-speed (55 yd. per min.) warpers and two high-speed warpers of an older model. Substantial savings in labor costs were realized by the installation of this equipment.

In the Catherine plant, one of the modern units spinning yarns for the knitting and weaving trades, a new high-speed ball warper and a link warper, both made by the Cocker Machine & Foundry Co., have been installed. Two new Cocker ball warpers, which operate at a speed of 600 yd. per min., were placed in the Eva Jane plant for running warps to be dyed in the continuous indigo process. There are in this mill three other high-speed (400 yd. per min.) warpers and one Barber-Colman unit for beam warping. Two new Barber-Colman automatic spoolers of 180 spindles each, which replaced seven old-type spoolers and four cone winders, now supply yarn to the warpers in the Eva Jane plant.

Other new Barber-Colman equipment placed in operation during the last several months includes two 180-spindle spoolers in the Birmingham plant, and one 180-spindle spooler and a ball warper at the Pell City plant.

Automatic temperature controls and recording instruments have been installed on size kettles, slasher cylinders and size boxes in the Eva Jane plant. Similar instruments have been placed on the slasher-room equipment in other plants where it was found that the character of the work required warps of great uniformity. Temperature-regulating instruments have also been placed on calenders in the finishing department of the Birmingham plant.



*Whitin-Casablancas long draft frames that replaced old spinning*

*Indigo dyeing machine in dye plant of Avondale Mills Sylacauga, Ala.*

The weave rooms have not undergone any radical changes in recent years, although at the Eva Jane plant some additional dobby looms were installed in space formerly occupied by spinning frames. This spinning, incidentally, was moved to other floor space released by roving frames that were eliminated when the plant was changed over to long-draft. All old looms in the Eva Jane plant have been equipped with Midget feelers. Some experimental tests are being made on a new Draper Model-X loom recently installed in one of the plants weaving gray goods.

Diversification of the products at the Sally B. and Eva Jane plants required the expansion of dyeing facilities at Sylacauga. In 1928, the Sally B. Mill No. 2 was equipped with looms for the production of cotton blankets. Consequently, it was necessary to build a dyehouse, which has since been expanded to handle the necessary dyeing for the colored-goods lines now produced in the Eva Jane plant. A building addition, 201 ft. by 55 ft., with side-walls composed almost entirely of windows, was completed last fall and a considerable amount of new dyeing machinery installed. The plant is now equipped with the Cocker continuous indigo-dyeing machine, 20-warp capacity, and both raw-stock and package dyeing machinery. This includes two Delahunty revolving-cylinder machines for dyeing raw stock. Two Tolhurst extractors and one Proctor & Schwartz 60-in. dryer were recently installed in the new addition. A Cocker continuous indigo warp dyeing machine has also been installed in the Pell City plant.

The modernization program has included the purchase of much miscellaneous auxiliary mill equipment. Additional Bahnson humidifiers were installed in the Central plant, while the lighting system of the Eva Jane plant was completely modernized according to the latest engineering practice. Another addition to the equipment at Sylacauga has been a new Permutit water softening system. Several of the steam plants have been equipped with the Warrior fuel pulverizer and stoker units which have increased the efficiency of boiler operation.

# *Modernization Program*

## AT CHARLOTTESVILLE

## HAS IMPROVED QUALITY AND REDUCED COST

THE construction of new buildings to replace obsolete and inadequate structures, together with the modernization of productive equipment, has been responsible for greatly increased manufacturing efficiency at the Charlottesville (Va.) Woolen Mills. This company's modernization program, which was started in 1927, although involving no appreciable expansion of productive capacity, represents total expenditure of nearly $350,000. The various construction projects and machinery replacements of the last several years have been financed entirely out of accrued earnings and have not required the raising of any new capital.

The company's history extends back many years before the Civil War. On two occasions during the mill's existence it has been destroyed by fire—first during the Civil War and again in 1882. The building in which the main office is now located was erected in 1847 and its brick walls are still in excellent condition. D. Van Wagenen, president and general manager, who came to the textile industry from the steamship business, has been in charge of the company for the last 15 years, during which time the mill has been remarkably successful. The outstanding capital stock, amounting to $300,000, is largely held in Charlottesville and vicinity, where the control has remained for several generations.

In 1927, when the first new construction and important modernization were undertaken, there were 176 employees on the regular payroll of the company. The significant fact is that today, operating less machinery but turning out practically the same volume of goods, only 109 operatives are required in the plant. Whereas prior to 1927 the manufacturing operations were scattered around in seven or eight poorly arranged and lighted buildings, with congested conditions in almost every department, now all processing has been concentrated in four buildings, three of which are practically new. According to Edward Van Wagenen, vice-president and assistant manager, the transfer of equipment to the new buildings, in which vibration has been eliminated, was directly responsible for an increase of about 16% in the production per set of cards, and an increase of approximately 25% in the production per loom. The modernization of productive equipment, with the other economies made possible by modern buildings, has shown substantial savings in power costs. Moreover, quality of the product, which consists entirely of woolen goods for uniforms, has been improved to a great extent.

Although the most significant changes in the plant lay-out were made last year, it is somewhat difficult to segregate only the most recent machinery replacements, as the program as a whole has extended over some five years and practically every move has been made with the complete modernization plan in mind.

The large three-story brick building, erected in 1882 after the second destructive fire, was recently altered and repaired to accommodate the various preparatory processes up to carding. The top floor has been given over to wool sorting, and suitable bins for this purpose have been installed. A system of fans and conveyor pipes has been provided to carry the loose stock, previous to the carding process, thus eliminating a considerable amount of manual labor formerly required in handling the stock from one machine to another. Wool scouring and stock dyeing, which have been handled in separate buildings and under somewhat crowded conditions, are being brought together on the ground floor of the large building.

In order to provide the proper foundation for scouring and dyeing equipment, a concrete floor is being placed in the building, but several feet below the old wooden floor, which is being removed. The scouring machinery consists of two scouring bowls and two rinsing bowls. The dyeing equipment includes several tubs, a rotary extractor, two Hunter indigo-dyeing machines, a rinsing machine (similar to a wool-scouring machine), and a Proctor & Schwartz three-apron raw-stock dryer. Dyed stock is blown to the picker room on the second floor, where it is distributed to a group of enclosed bins. The conveyor pipe is equipped with mechanical switches to divert the wool into the proper bin.

The picking equipment has been connected together in order to eliminate excessive handling of the stock by manual labor. There is a 6½-ft. cone duster, with feeder, which delivers into the feeder of a 48-in. burr picker. This machine in turn delivers the stock into a tandem feed to the oiling and mixing picker. The stock is then

*General view of plant of Charlottesville Woolen Mills. From left to right: Cloth finishing room; weave shed; carding, spinning, and miscellaneous building; brick building for wool sorting and processes up to carding*

blown to the card room through a conveyor pipe by means of a Sturtevant No. 6 fan running 1,400 r.p.m.

The card room has been transferred to the third floor of an entirely new structure which was completed last year at a cost of about $190,000, including machinery improvements and the expense of moving from the old building. Five small detached buildings were torn away in order to make room for this new four-story building. This structure, which was designed by Lockwood Greene Engineers, Inc., New York, measures 88 x 180 ft., and is of brick and steel construction with a maximum amount of sash area. Allen J. Saville, of Richmond, Va., was the general building contractor.

The carding machinery at present consists of six three-card sets, but there is extra floor space to provide for four or six additional sets, while the building is sufficiently wide to accommodate four-card sets. When the cards were moved from the old building they were equipped with Whitin centrifugal clutches, Ramsey chain drives, and Westinghouse motors. At the rear of each set of cards is a receiving bin into which the stock from the picker room is blown.

The machinery in this room consists of five sets of Furbush (48 x 60) cards and one set of Davis & Furber (60 x 60) cards. Tape condensers have been installed on all cards feeding the ring spinning, while 20-in. ring doffers are in operation on three cards.

The fourth floor of the new building is used for the spinning room. Four new Whitin ring spinning frames of 180 spindles each, replacing 2,100 spindles of mule spinning built in 1882, are located at one end of the room. These ring spinning frames, three of which were purchased last year, have individual-motor drives using silent-chain transmission. In addition, there are four Davis & Furber mules of 360 spindles each which were moved from the old building. The mule spinning was purchased new in 1921.

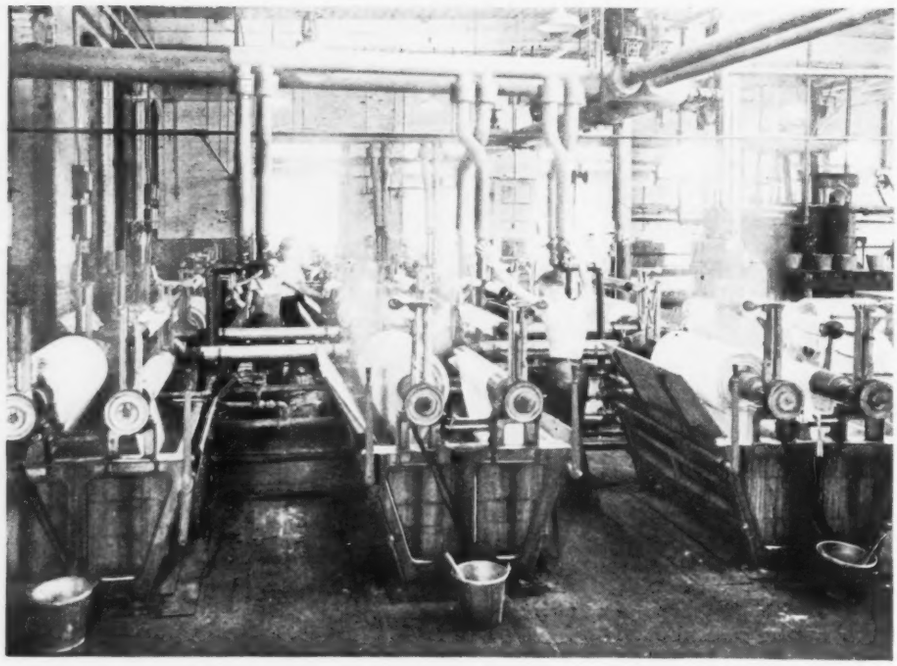
The second floor of the new building has been wired and arranged to accommodate any kind of woolen or worsted equipment; and, while at present this floor is not being used, the space is available for future expansion of productive equipment. The first floor, which was partially excavated out of a solid-rock hillside, contains the pipe shop, the machine shop, and the carpentry shop. One section on this floor, next to the weave shed with which it is connected by an enclosed passageway, has been utilized for filling winding and warp preparation. There is a part basement, extending the full length of the building, used by the company for general storage paint shop.

The weave-room building, which was completed in 1927 at a cost of $50,000, is one story with saw-tooth roof construction, and is about 76 x 160 ft. The machinery in this building has been rearranged twice since 1927. All looms are 92-in., with the exception of five that are 100-in. Four new Crompton & Knowles 92-in. automatic looms were purchased in 1931, and were found to be so satisfactory that six additional 82-in. looms of the same type are now on order, which will bring the weaving equipment up to a total of 44 looms.

The finishing building, which is almost a duplicate of the weave-room building, and connected to it by an enclosed passageway, was erected in 1929. The building and new finishing machinery installed at the time cost approximately $92,000. The latest addition to the finishing department is a Hunter "Nickel Clad" piece-dye kettle which replaces the old arrangement of dyeing with a hand reel and open tub. The finishing equipment, including that purchased in 1929, consists of seven fulling mills, three cloth washers, two up-and-down teasel gigs, two wire nappers, one teasel napper, a carbonizing machine, a tenter dryer, a wet-finishing machine, a rolling machine, and a vacuum extractor with scutcher.

One end of this building, separated by a partition, is devoted to dry finishing and houses a Parks & Woolson cloth-shearing machine, a Voelker rotary press, a David Gessner decating machine, and a Parks & Woolson steam brush. The cloth-storage and shipping department, located in part of the main office building, was remodeled in 1932 to provide more room for office space.

One of the major installations of auxiliary equipment last year was the erection of a 50,000-gal. tank, mounted on a 50-ft. tower, and covered with two coats of aluminum paint. This tank, which is used for fire protection, was purchased from the R. D. Cole Mfg. Co., Newnan, Ga.



*Union Bleachery dyehouse showing grouping of jigs*

# *Bleachery Modernization*

## PERMITS QUICKER DELIVERY AND VARIETY OF FINISH

IN THE story of modernization at the Union Bleachery we find an outstanding example of what an old established plant has done to keep its equipment and methods in line with modern practice. Originally organized under a New Jersey charter in 1902 as the Union Bleaching & Finishing Co., it commenced operations at Greenville, S. C., in a small way in 1903 under what may be considered as most unfavorable conditions in the fact that there had just been two notable failures in the finishing industry, both of them in South Carolina. The management, in analyzing these failures, attributed their cause to an attempt to produce with untrained help such finished results in bleached, dyed, mercerized and printed fabrics as had required several generations for the eastern plants to accomplish.

Union Bleachery, therefore, proceeded on the theory that operatives should be trained on the simplest lines of bleached goods only, such as muslins, cambrics and nainsooks. From an original weekly capacity of about 400,000 yd. and a capital of $240,000, the company has grown to a capacity of 2,000,000 yd. per week, with a capital of $1,200,000. With a bare factory building at the outset, the organization has added nine warehouses, a village of 150 residences, together with a commodious Community Building containing an auditorium, dining room, reading room, lodge rooms and bath rooms. Union Bleachery was chartered in South Carolina in 1922.

This growth involved the addition of floor space and machinery from time to time to handle more intricate finishes. The importance of keeping plant equipment as modern as possible has been kept in mind throughout the years of the company's existence. It is now prepared to produce on all weights of fabrics almost any desired finished result with the exception of printing.

The singeing process offers an example of how the plant has been kept up-to-date. The original installation consisted of old-type plate singers. Some years later, flame singers were installed; these in turn were replaced by rotary plate singers. More recently, with the introduction of high-compression gas burners, flame singers have been adopted again. Speeds have increased gradually until, with the present-type equipment, the singeing process is rapidly approaching 400 yd. per min.

Automatic bin and kier pilers, with individual motor drives and equipped with ball bearings, have been installed. In the bleach house, the use of heat exchangers has made it possible to reclaim hot water which can be stored for subsequent use in process work, or returned to the boiler room to be combined with the feed water. Two extra kiers have been pressed into service as storage reservoirs for hot water in the bleach house. Two modern oxidizers were installed in the bleachery about two years ago.

### *Handling Reduced to Minimum*

In the several plant expansions, the management has kept in mind the economic necessity of maintaining a continuity of processing, so that there shall be no avoidable handling of the goods. Bearing somewhat upon this policy, an executive of the company related the following case:

An order for 25,000 yd. of a special finish for export was received by wire with the request that shipment be

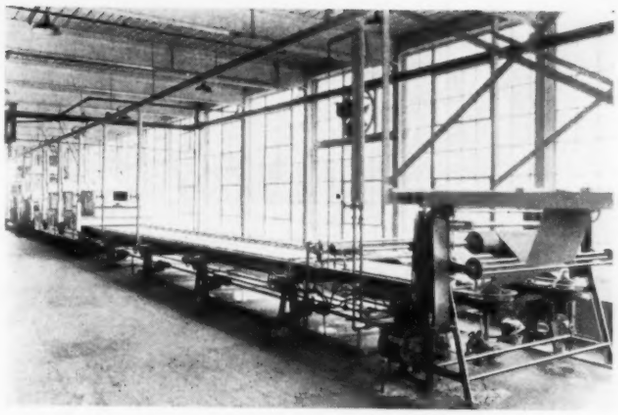
made one week after receipt of gray goods at the bleachery. The goods were not received from the weaving mill until two days later than specified, but as the shipment was intended for a particular sailing date at the port, the bleachery rushed the processing of this batch and shipped the complete lot on the date originally planned. The goods were in the plant only three working days.

An even more striking instance, related by the same executive, was that of a sample piece upon which telephone instructions were received from New York on a Thursday, the goods still being in a gray state. The finished sample piece left Greenville by air express on Friday and was received in Chicago Saturday morning. Such rapid deliveries, though not of frequent occurrence, would have been impossible without modern layout and method of handling goods in process.

Modern methods have led to the conversion of machinery to range work in all cases where practicable. The rearrangement of water mangles, dry cans, and starch mangles so that they operate in range is an example of this type of economy at the Union Bleachery. Foxwell guiders and folders have been installed in the dyehouse. The speed and range of dyeing has been increased by the installation of a continuous dyeing machine which is equipped with accurate temperature controls.

In the folding and inspecting departments, considerable economies were effected by arranging the machines to provide a straight-line flow of production. More efficient handling of open stock has been made possible by the construction of substantial shelves which are provided with curtains to protect goods from dust and dirt. These shelves not only save floor space but also permit the plant to keep more accurate records of open stock.

Modernization has been carried even into the packaging of goods for shipment. To a certain extent the old-type heavy wooden cases have been superceded by fiber-board cases which, as the amount of tare is greatly reduced, represent considerable saving in transportation costs.

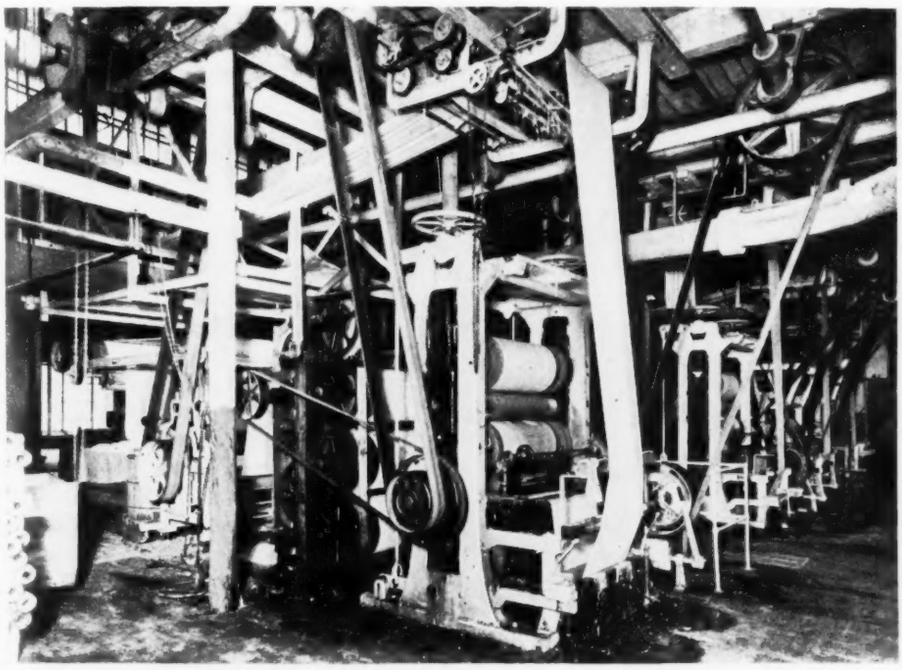


*Sanforizing machine—one of the three complete units at Union Bleachery*

Typical of the company's progressive policies, though not strictly concerned with the modernization program, was the installation of Sanforizing equipment. Union Bleachery was one of the first concerns to enter this particular field of pre-shrinking and has engaged in considerable pioneer work in the development of correct finishes on Sanforized goods. The company now has three complete Sanforizing units which are located in a modern building addition, two stories in height, completed in 1931. This addition also houses the modern machine shop on the first floor where much of the reconditioning and revamping of old equipment is handled.

One of the recent developments in the plant has been the organization of an efficient supply department that will permit substantial savings. This new system, for which one man is entirely responsible, enables the superintendent and purchasing agent to have an accurate record of supplies and parts on hand at all times. Waste in handling materials, such as starch, oils, gums, etc., has been greatly reduced since this system was introduced.

Economy in plant operation is the firm's watchword as the company prepares itself to meet the keener price competition that has grown out of the depression. J. E. Sirrine & Co., of Greenville, handled the design of the building addition and a new power plant, also completed about two years ago, and have acted as consultants in the general modernization program. Miscellaneous improvements at the Union Bleachery include the installation of a hot-air system in wet processing departments to absorb excess moisture to avoid trouble from condensate, the use of daylight lamps for color matching, and the utilization of low-pressure steam bled from the turbine for process work wherever possible.



*Ranges made up of water mangles, dry cans and starch mangles*

# "Old" 1926 Plant

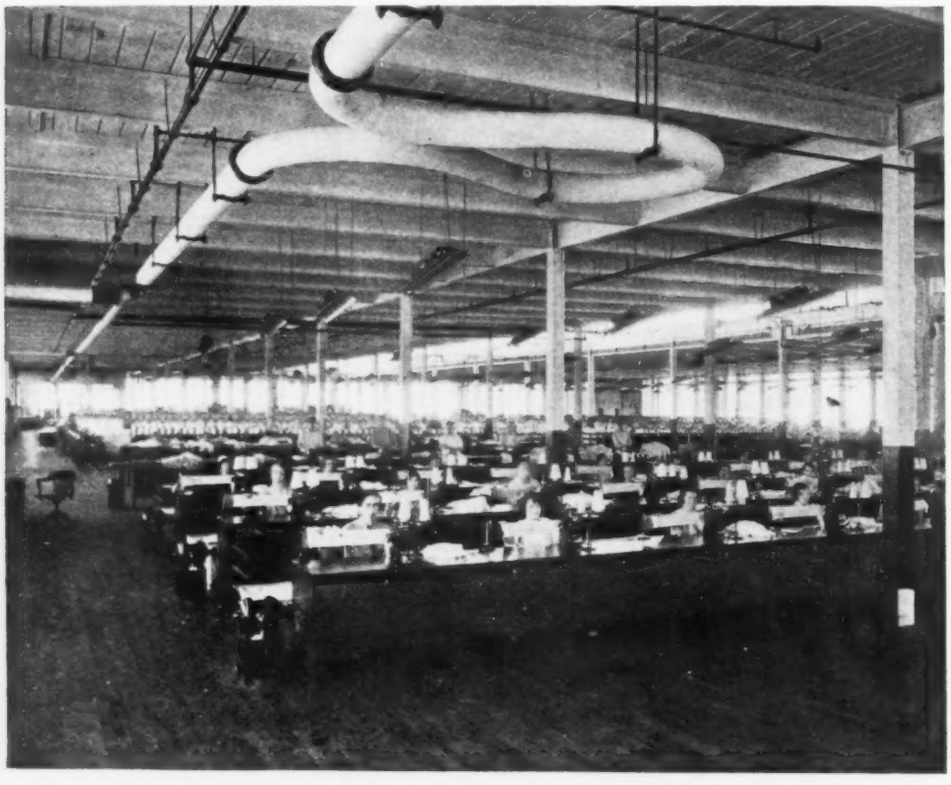
## KEPT NEW AS PROTECTION FOR HANES HOSIERY CO. PROFITS

LESS than seven years ago, the Hanes Hosiery Mills Co., at Winston-Salem, N. C., built and equipped an entirely new mill which was regarded at the time as the most up-to-date plant in the country for the manufacture of women's seamless hosiery. The construction of this mill represented a major modernization project, as the company's old plant located in another part of the city was abandoned, and all old machinery junked. If the management of the Hanes Hosiery Mills had not appreciated the necessity of replacing non-profitable lines with products that could be merchandised at a profit, the plant which was completely modern in 1926 would now be obsolete, and this article would not have been written.

### *Efficient Management*

However, largely as the result of efficient management and an established policy of maintaining the plant in position to manufacture an acceptable product for a market greatly influenced by the style element, the company has continued to prosper and to enjoy a steady growth. The majority of machinery replacements in the Hanes Hosiery Mills have been made, not because the old machines had worn out, but as the result of obsolescence due to style changes. Quantities of old knitting machines, although in fairly good physical condition, were broken up and sold as scrap, rather than permitting small operators to purchase them for a "song" and thus to harass the industry with additional price competition.

In the last two years the company has installed 500 new Model K Scott & Williams fine-gage 25-step spiral knitting machines and, according to James N. Weeks, vice-president and general manager, it is very probable that this number of spiral machines will be doubled by the end of the year. These new-type machines, of which the Hanes Hosiery Mills have by far the largest installation in the country have generally replaced old 260-needle Scott & Williams Model K machines. The new spiral machines are equipped to make any kind of clocks or lace patterns that can be made on full-fashioned knitting machines, and also to produce a type foot that is nearer the full-fashioned foot than anything made on seamless machines of previous design. Features are the new methods of knitting an actual gusset toe and a square type of heel. The new spiral machines, as well as all but a few of the old Model K machines, are equipped to make what is known in the trade as the "stretchy" welt. This is much more elastic than any welt previously made on seamless machines, and it is produced automatically.



*Seaming and looping department of Hanes Hosiery Co., where finer work is now being handled*

Last year the company completed a two-story plant addition that was needed to allow more space for winding and yarn preparation, and to relieve congested conditions in the packing and shipping departments. The top floor of the new structure, which is level with and connected to the knitting room, is used for receiving yarn shipments and for preparing all kinds of yarn for knitting. Shipping cases are carried from the concrete platform at car-door level up an incline for a distance of about 40 ft. to the yarn preparation room by means of a Lamson endless chain type conveyor. This equipment is operated by a three horsepower General Electric motor.

*Well equipped boarding department of Hanes Hosiery Mills Co., at Winston-Salem, N. C.*

Two soaking vats have been installed in the yarn preparation room for silk and rayon. There are two extractors for removing excess moisture from the yarn after soaking. The company has no throwing equipment as it has been found more advantageous to have this processing done by the commercial throwsters.

All yarn received in skein form is wound on large metal bobbins which are especially adaptable for use on the knitting machines. Several winders, furnished by the J. K. Altemas Co., are used for this purpose and, with the additional knitting capacity, it was necessary to increase the floor space utilized by winding equipment.

The yarn preparation room has been equipped with two new units of Carrier heating, ventilating and humidifying equipment. Since good lighting is essential for efficient operations in the knitting mill, the Cooper-Hewitt system, installed when new mill was built, has been increased in winding and knitting departments.

The next process following knitting is that of trimming, or double sole clipping, which is done by hand in some mills. The company has about 20 new type automatic power clippers that were built by Smith, Drum & Co. In this department, as well as in the seaming and looping departments, Lupton steel machine tables with modern safety features have been installed. Shafting is all enclosed so that the operative is protected from the danger of exposed working parts. These machine tables have several advantages over the old tables with cast-iron legs and wooden tops. Not only has vibration been practically eliminated, but also the trouble caused by snagging goods on the wooden tops has been overcome.

There have been no major changes in the seaming and looping equipment, with the exception of changing the loopers to handle fine-gage work, which was made necessary by a shift of the plant's output to fine-gage hosiery. Seaming machines, supplied by the Union Special Machine Co., and "Sotco" loopers, made by the Southern Textile Machinery Co., are used throughout.

The dyehouse is completely equipped with rotary-type dyeing machines, built by the American Laundry Machinery Co., in sizes ranging from 25- to 500-lb. capacities, and all constructed of Monel metal. Permutit system for water softening has been installed.

The boarding room is completely equipped with Proctor & Schwartz 30-board automatic machines that require two operatives each. Various improvements, including automatic counters, have been added to this equipment from time to time. Temperature controls have been provided so that the amount of heat may be regulated to suit the weight or type of goods. Air conditioning equipment has been installed in the boarding department to keep it at a temperature low enough to maintain good working conditions for the operatives.

### *Accessories Well Handled*

There have been few changes in the grading and packing departments. The introduction of transparent wrapping materials, such as Cellophane, naturally led to some changes in the methods of packing. Steel cabinets have been installed to keep stocks of transfer papers, tickets, labels and other materials used in marking and wrapping the product. Heavy shipping cases have been replaced by light wood veneer or fiber-board cases that afford considerable savings in transportation costs.

The modern machine shop and parts department are located in one wing of the new addition, convenient to the knitting room, while the bottom floor of the new structure has been given over to storage space for stocks of packing materials, boxes and shipping cases.

Two first-aid rooms, fully equipped with hospital facilities, have been added within the last two years, and a full-time graduate nurse employed. All operatives are covered by group life and accident insurance. Everything has been done to improve working conditions.

# *Operating Economies*

## FOLLOW MODERNIZATION OF BUILDINGS AND OF AUXILIARY EQUIPMENT

*By Francis A. Westbrook, M.E.*

MANY manufacturers are taking advantage of the low prices of equipment and supplies of all kinds to modernize their plants. Some remarkable results have already been achieved in the way of operating economies, increased output per worker, etc. A considerable amount of this kind of work is under way, and in all probability more will be undertaken during the ensuing months. This of course is significant and important, for it means that those textile mills which have reduced production costs have a distinct advantage over their competitors.

With this very practical need for modernization, the question naturally arises as to what steps should be taken. The advantages of labor-saving production machinery are well known; but in addition there is a great deal of modern equipment not directly concerned with actual production which can be made use of to effect attractive savings. Particularly good features about much of such equipment are that it does not involve a large outlay, and the savings which it makes possible pay for it in a short time. Equipment of this type includes automatic control instruments, power-saving devices, power-transmission equipment, plant repair-shop equipment, mechanical-handling machinery, etc. The best way to see what can be accomplished is to describe briefly what has actually been done in recent years in a number of textile plants.

### *Materials-Handling Equipment*

Perhaps as good an item of equipment as any to start with is that required for the mechanical handling of materials. A good many textile plants cover large areas of floor space, and for this reason the rapid movement of materials is an important problem. Not only is it important from the standpoint of rapid movement, but also from the standpoint of labor. Thus, at the Pacific Mills Print Works tractors are used which haul trains of trailers. There are something like 2,000 trailers in service and each tractor haults as many as 16 trailers, covering some 35 miles a day under normal operating conditions. What this equipment means in the economical operation of the plant it is hardly necessary to stress.

It may be said that the conditions under which internal transportation must be rendered are peculiar to the textile industry, not only on account of the long distances to be covered, but also on account of the large numbers of machines which, for efficient production, must be grouped together. This is very marked in the spinning room and weave shed of the Pequot Mills, where tractors and trailers have been used with great resultant economies.

Up-to-date power plants are necessary for textile plants where process steam is in demand. In recognition of this fact the Slatersville Finishing Co. installed a new power plant with two 600-hp. boilers of the latest design. Each boiler is capable of furnishing 150 million lb. of steam a year for finishing. In addition to this, auxiliary equipment of the most modern type has been installed, including coal-handling machinery, de-aerating feed-water heaters, ash hoppers having quenchers and water-sealed gates, turbo-conoidal fans to deliver air for combustion, automatic coal weighers, and superheaters which will be used when power generation is undertaken.

Provision of a well-equipped plant repair shop is another item which helps toward the general economy of operation. A repair, or maintenance, crew must naturally be on hand at all times in order to take care of emergency work and to keep the plant in operation. A certain minimum amount of machinery is also required for this purpose. Repair-shop machinery used by one of the largest manufacturers in the textile industry includes a lathe, pattern maker's lathe, drill, band saw, saw bench, buzz planer, planer, and spray outfit in the wood-working department. In the machine tool department there are several lathes, radial drill, planer, drill press, power hack saw, key-seating machine, grinders, and gear shaper. The latter has been found to be an extremely useful tool by many mills, such as Gainesville Cotton Mills, Monarch Mills, Joanna Cotton Mills, etc.

As regards painting, it may be said that a regular program is the best way to keep the plant in first-class condition as to cleanliness and light at all times. It is hardly good practice to paint one in a while when the place gets so dirty that the quality of the work suffers and the efficiency of the lighting falls down. Besides there are good reasons for doing this kind of work at the present time because of the comparatively low cost of paint. One of the largest concerns in the textile field has decided that the best thing to do is to paint at regular intervals. It has installed its lighting according to the standards of the Edison Laboratories, and it finds that unless it keeps up the interior of the mill so that light will not be unduly absorbed by dirty walls and ceilings, it will not get the full benefit of the money spent on lighting equipment. This company has several plants,

and it keeps a permanent painting crew at work going the rounds and painting both the inside and outside of its buildings, including mill-village houses, according to standards which it has developed with the help of well-known and reliable paint manufacturers. In this way everything is kept up as it should be; the cost is a constant item of expense, and not something of an unusual character which must be passed upon by some authority each time the question comes up. It is also economical because the paint is purchased in large quantities and the inefficiencies resulting from poorly kept up premises are avoided.

### *Control Instruments*

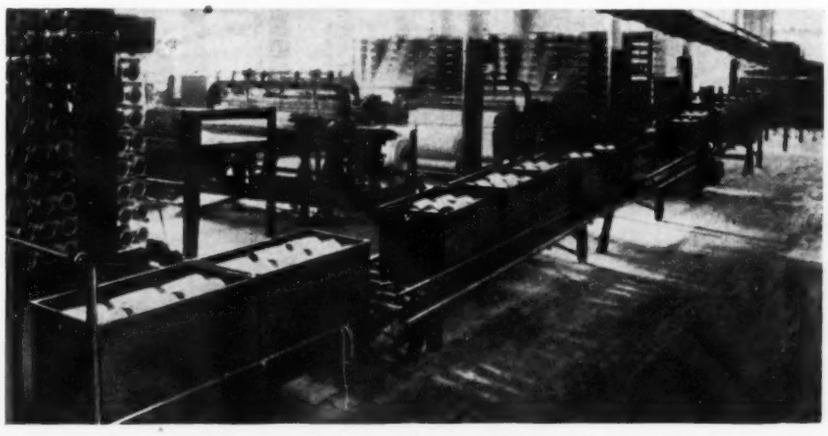
When it comes to a discussion of the advantages of installing instruments for the automatic control of temperatures, pressure, humidity, etc., there is so much to be said that it is difficult to know where to begin. To summarize the matter briefly we can say that control instruments make possible uniformity of quality impossible with hand control. They avoid waste of steam, and consequently fuel, because they keep temperatures constant. They avoid spoilage because they may be depended upon to prevent variations from set standards which experience has shown to be neccessary. Recording instruments also provide automatic records of operations by means of which the management can check what is going on in the plant.

Humidity-control instruments are on the market by means of which uniform humidity can be assured in all parts of the room no matter what the direction of the wind outside, which windows the sun is shining into, etc. This not only makes for better operating efficiencies from the purely mechanical standpoint, but it also provides better working conditions for the help. This need of automatic control applies to bleaching, dyeing, and all the other processes where specific standardized temperatures or humidities must be maintained. There is no use in setting standards without providing the means for maintaining them.

### *Power-Factor Improvement*

In considering advantageous steps in modernization, one should not overlook the electrical equipment. One item in which almost sensational savings have been made has been in the correction of low power factors. This is frequently looked at as a rather technical matter which people are likely to dodge if they can, but it is also a practical one which has meant a good deal in dollars and cents to a number of textile manufacturers and could mean as much to a great many more. For example, a dye works in Philadelphia saved over $1,700 a year by improving its power factor; another plant, a hosiery mill, cut down its power bill very materially; and in still others savings running up into several thousand dollars a year have been realized. The means of improving power factors are simple enough. There are three items of equipment which will do it, the choice depending on conditions. These items are synchronous motors, Fynn-Weichsel motors, and static condensers. The motors should be used to drive machines which are in continuous operation so that their effect will be present all the time. The condensers are usually installed at each motor which has a low power factor. Synchronous motors as now made are free from the temperamental characteristics which gave the early applications a good deal of a black eye. It is decidedly worth while to find out about the plant power factor, and if it is low, to consult with reliable manufacturers of corrective equipment as to what is best to install under the circumstances.

That the savings from modernization are not at all necessarily associated with large and expensive equipment is nowhere better demonstrated than in the remarkable economies resulting from the substitution of ball bearings for plain sleeve bearings. This applies to the bearings for shafting, motors, and production machinery of almost all kinds. Wasted power from the friction in sleeve bearings is reduced to a minimum. Maintenance costs for lubricants, lubricating labor, repairs to sleeve bearings, interruptions to production due to enforced shutdowns from worn sleeve bearings, etc., are greatly decreased. One print-cloth concern reduced its yearly operating cost, including power, by about $5.25 per motor, and it had 176 motors, by using ball-bearing motors. Other mills have had similar results—not only with motors, but also with various others items of equipment.



*Use of modern materials-handling equipment effects reduction in manufacturing costs*

From a survey made of conditions in New England it was found that many concerns were meeting the conditions of the depression by cutting costs, developing new and improved products, etc. As a basis for this, however, was always present a preliminary revamping of the plant in order to make it as efficient as possible. In almost every instance this included modernization of the mill buildings in order to provide accommodations for the new machinery or for more efficient layouts of existing machinery. The use of up-to-date handling equipment, individual motor drive, etc., often makes such changes necessary. In many cases this can be done at small expense, especially at the present time, and the investment can be made to pay handsome dividends.

Modernization along the lines we have discussed is equally advantageous in the indirect efficiencies which it makes possible. That is, in addition to being the means of reducing direct costs, practically all of the items we have discussed, and they have only been of few of the possibilities, promote the smooth running of the plant and assure freedom from all sorts of petty annoyances which upset in varying degrees its harmonious functioning as a whole.

# Textile Chronology for 1932

**Despite the depression, there were 12 months in 1932—in fact, even an extra day due to Leap Year. Also, despite the depression, things happened in textiles. Many of these events cast their shadows into 1933. Mixing our metaphor badly, we believe they promise a brighter year. . . . Perhaps some things are said herein which might better have been left unsaid—and vice versa. If so, the chronologist apologizes for being human. . . . P.S. Items which can be dated, are; others, representing items of no specific day, are left undated.**

## JANUARY

Earl Constantine elected managing director of National Association of Hosiery and Underwear Manufacturers succeeding John Nash McCullaugh, who resigned in previous spring. (Jan. 12.)

Print-cloth manufacturers recommend voluntary adoption of shorter work-week for six months commencing Mar. 1. (Jan. 21.)

Francis P. Garvan elected president of U. S. Institute for Textile Research succeeding Dr. Samuel W. Stratton, deceased. (Jan. 22.)

Leading cotton mill executives and selling agents confer with Secretary of Commerce Lamont; pass resolution urging preservation and further acceptance of "55-50" work-week plan and women-and-minors night-work policy. (Jan. 25.)

Move to curb weighting and stretching of knitted rayon fabrics initiated at meeting of producers and retailers. (Jan. 25.)

W. Ray Bell elected secretary of Association of Cotton Textile Merchants of N. Y. succeeding Perry S. Newell. (Jan. 28.)

Combed yarn mills of Gaston County announce policy of producing yarns only against actual specifications; regarded as a stabilizing influence.

Mercerizers of cotton yarns adopt new sales contract form to curb the practice of "contract-jumping" by their customers.

## FEBRUARY

Announcement made that over 90% of print cloth mills agreed to conform to recommendation looking toward avoidance of over-production and better stabilization of employment. (Feb. 18.)

Group of hosiery manufacturers forms patent pool to utilize Schwartz non-run patent.

Associated Knit Underwear Manufacturers of America, in series of letters to retailers, dramatizes folly of undue emphasis on price.

Organization plans of Throwsters Research Institute completed; headquarters opened in New York; Dean Hill appointed executive secretary.

Mesh vogue assumes "boom" proportions in hosiery field.

New single-bath process developed for boiling-off and dyeing silk, which enables marked savings in degumming costs.

## MARCH

Cotton mills overwhelmingly endorse policy of elimination of night employment of women and minors; this policy goes into effect for second year, with 86% observance. (Mar. 1.)

Committee of worsted yarn spinners formulates plans for credit investigating and reporting service, with Frank E. Slack as managing director of group.

Utilization of latex compounds recognized as opening new fields in textile

fabrication and finishing. Lastex yarn proves important branch.

Labeling code for part-wool blankets adopted by meeting of manufacturers and distributors; to be submitted to letter-ballot and to become effective at end of year if approved in writing by 65% of industry.

Curtailment of rayon production emphasizes the power of cooperation as a constructive undertaking.

Paolino Gerli succeeds Thomas B. Hill as president of Silk Association of America. Latter suggests silk industry may have to appoint dictator. (Mar. 23.)

## APRIL

Research fellowship and scholarship awards announced by Textile Foundation. (Apr. 7.)

Marked progress in improvement of knitting-mill equipment shown at Knitting Arts Exhibition. (Apr. 11-15.)

Mechanically variable-speed spinning and twisting announced. (Apr. 12.)

Plans for organization of a "Stabilization Council" for the entire wool industry formulated at meeting under auspices of National Association of Wool Manufacturers. (Apr. 12.)

Program of National Association of Hosiery and Underwear Manufacturers outlined by Earl Constantine, new managing director, at annual meeting. (Apr. 14.)

Uniform salesnote clauses recommended as standard practice to cotton textile trade by committees representing Textile Converters Association, Textile Brokers Association, and Association of Cotton Textile Merchants of New York.

Broad study of "two-tone" raw silk problem planned by National Association of Hosiery and Underwear Manufacturers; appointment of committee authorized. (Report made in October.)

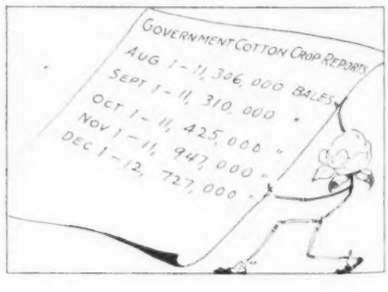
Definitions for weighted or mixed silk goods set at Trade Practice Conference held under auspices of Federal Trade Commission; to be submitted to industry for individual approval. (Apr. 21.)

So-called "syndicate silk," held by Japanese Government, sold to Asahi Corp.; distribution agreement concluded by latter company with E. Gerli & Co., New York. Cancelled later; see June. (Apr. 25.)

Plans crystallized for activities of newly-organized National Quality Maintenance League, involving campaign to educate consumers to insist on quality in textiles.

## MAY

Wool Industry Advisory Board, with Col. Chas. F. H. Johnson as chairman, set up at meeting of representatives of



12 associations in wool and allied industries. (May 5.)

Report on "The Distribution Problems of the Woolen and Worsted Industries," prepared by Paul T. Cherington for Textile Foundation, released. This is first of a series of distribution studies.

R. B. King, secretary of Hampton Co., elected president of Durene Association of America, succeeding J. S. Verlenden. (May 12.)

Second annual National Cotton Week held; widespread cooperation contributes to its success. (May 16-21.)

Withdrawal of lines of heavy-weight ribbed underwear until first of June proves helpful step in market.

Agreement between textile manufacturers and retailers, ratified at hearing before House Patents Committee, removes last serious obstacle to legislation to suppress piracy of designs; action by next Congress expected (May 17).

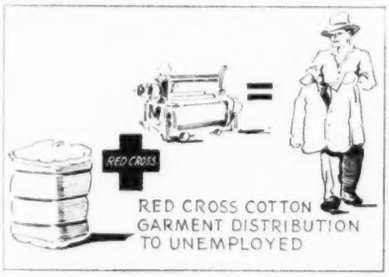
B. B. Gossett elected president of American Cotton Manufacturers Association, succeeding Cason J. Callaway. Convention favors reasonable tariff on jute and jute products. (May 20-21.)

## *JUNE*

Successful mill operation of warpers at speed of 900 yd. per min., announced this month, represents another forward step in cotton-manufacturing practice.

Successful application of variable-speed drive applied to looms recorded.

Licensing of large dye-house to process silk by tin-lead weighting process renews controversy as to effect of this process on durability of the fabric and on health of the users. Definite proof lacking on controversy.




Japanese Government cancels Asahi-Gerli contract for distribution of "syndicate silk"; trend noted toward socialization of silk industry in that country, involving of course production control.

Two successive price reductions in rayon bring 150 denier viscose, key number, from 75c. to 55c. Plant shutdowns, for month or longer, put into effect as curtailment measure.

Withdrawal of heavyweight ribbed underwear lines continued beyond date originally set.

Options on Graenz patents for making non-run full-fashioned hosiery taken by Gotham Silk Hosiery Co.

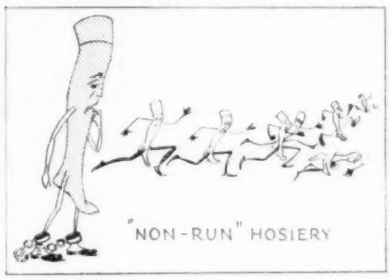
Progress toward clarification of distributor-manufacturer relationship, by joint action between National Knitted Outerwear Association and Wholesale Dry Goods Institute, announced at annual convention of former organization. (June 16.)

New silk-weighting rules, adopted at Trade Practice Conference earlier in year, approved by industry according to announcement by Federal Trade Commission. (June 17.)

Textile symposium, developed by Committee D-13 of American Society for Testing Materials held at annual meeting of parent society. Prof. Herbert J. Ball re-elected chairman of Committee D-13. (June 20-24.)

Frank K. Petrea elected president of Southern Textile Association at annual meeting. (June 24-25).

Constructive price action reflected in Aberfoyle Mfg. Co.'s announcement that it would advance its prices on its Durene yarns one month hence, July 15, if demand for its product did not increase. By such action, company hoped to avert need for further decline in living stand-




ards of its employees. Following its word, prices were advanced in July.

Radical price reductions made in worsted suitings for announced purpose of stabilizing market and paving way for future advances.

Jerome Lewine re-elected president of National Raw Silk Exchange. (June 29.)

Microscopic method developed for controlling delustering of fabrics containing cellulose acetate.

## *JULY*

Cotton-Textile Institute announces that it will submit to referendum the question of complete elimination of night work in cotton mills; move would require 90% support to be effective. Plan endorsed by American Cotton Manufacturers Association. (*Note:* Although no subsequent announcement was made, it is understood this proposal failed to obtain required support.)

Appointment of Advisory Council announced by National Association of Hosiery and Underwear Manufacturers to analyze major problems of the industry and prepare agenda for general meeting in October. (July 13.)

Improved business and firmer prices noted in woolen and worsted goods.

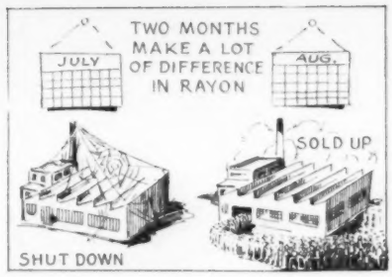
Silk Association of America holds first fabric show, featuring fall broadsilks. (July 20-21.)

Quality control plan, involving use of label, developed by Carpet Institute of America, according to announcement by Herbert Gutterson, president. (July 25.)

Non-run hosiery patent, for both circular and full-fashioned, issued to Jones and Mills, of England.

## *AUGUST*

Print cloth manufacturers, meeting in Spartanburg, recommend continuation of




curtailment program throughout remainder of year. (Aug. 2.)

Bullish Government cotton crop forecast of 11,306,000 bales boosts cotton prices and acts as stimulus to trade. (Aug. 8.)

Increased activity noted in rayon; trend increases during month, leading up to hectic pressure for deliveries. Prices advanced at end of month, bringing 150 denier viscose to 60c.

Interest in use of rabbit hair in apparel fabrics grows. Feather mixture yarns also sponsored.

Raw silk prices have meteoric rise; key number on exchange advances from $1.22 on Aug. 5 to $1.80 on Aug. 30.

Lines of non-run full-fashioned hosiery lines made under Schwartz patents opened at $10.50 wholesale to be retailed at $1.35. Fair production expected by Oct. 1.

Cotton goods sales in August totaled record figure of 510,531,000 yd. or 282.4% of production; stocks declined 25.5% during month to a record low at end. Unfilled orders increased 113%.

Handling of Farm Board cotton by Red Cross for relief entails orders for more than 2,000,000 yd. placed with mills up to Aug. 27.

Combed yarn spinners, meeting in Gastonia, N. C., adopt uniform sales contract form for general use in that branch of the industry. (Aug. 29.)

Prices advance in raw wool, wool top, and goods markets.

Velvet Guild formed to offset price emphasis and maintain velvets as a quality line; use of label involved.

Members of Throwsters Research Institute vote to continue organization on a permanent basis, following expiration of six-months trial period.

Sporadic instances of wage advances in textile mills hailed as extremely significant sign.

Increased activity and advancing prices in full-fashioned hosiery and in underwear.

Rough-surface fabrics become a major trend in silk and rayon goods.

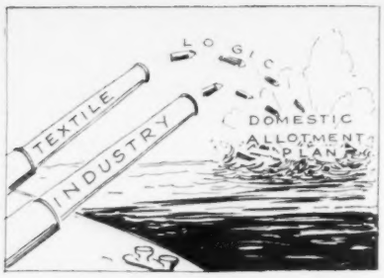
Wool consumption in August is high monthly figure thus far in 1932 and 2½ times greater than that for low month, May.

Run-proof circular hosiery introduced to market.

## *SEPTEMBER*

Continued evidence of completely changed picture in all branches of textile industry. Activity in most branches at feverish rate; however prices subnormal.

Cotton crop report of Sept. 8 estimates production at 11,310,000 bales compared with 11,306,000 Aug. 8.




Creaseproofing process for cotton and rayon fabrics, developed in England, arouses wide-spread interest; two American companies licensed to use it.

Protests against extension of cotton duck mill at Atlanta Federal prison made before Shannon committee in Washington by representatives of Cotton Duck Association and Association of Cotton Textile Merchants of N. Y. (Sept. 22.)

Textile wage criticized as too low by Irving Southworth, retiring president, and Ernest Hood, incoming president, of National Association of Cotton Manufacturers at annual convention in Boston. (Sept. 29.)

Preliminary report by committee on economic research, of U. S. Institute for Textile Research, offers suggestive program for such research.

Further limited cases of textile wage increases noted.

Sold-up condition continues in rayon.

Cotton goods sales for September are 103% of production; stocks on Sept. 30 represent new low record and are less than three weeks of current production.

## *OCTOBER*

Textile improvement well maintained.

Cotton prices break sharply on slight increase in crop estimate Oct. 8, despite fact that drop of 35% from last year is indicated.

Success attends Southern Textile Exposition in Greenville. (Oct. 17-22.)

New dye-jig, giving cloth constant speed and constant tension, and utilizing "electric eye" to control automatic reversing mechanism, shown at Southern Textile Exposition for first time. (Oct. 17-22.)

Cotton-Textile Institute, at seventh annual meeting, votes to amend by-laws to permit dealing with legislative matters; anti-trust law revision regarded as one subject deserving early attention. George Sloan re-elected president. (Oct. 19.)

George S. Harris outlines at Cotton-Textile Institute meeting, how Red Cross has handled utilization of 500,000 bales of Farm Board cotton voted to it by Congress. Total purchases to date, 46,000,000 yd. (Oct. 19.)

Progress in application of long-draft system to roving outlined in address at meeting of Textile Division, American Society of Mechanical Engineers, in Greenville. (Oct. 19.)

Pre-shrinking is one of principal subjects discussed at semi-annual meeting of Southern Textile Association, at Greenville. (Oct. 21.)

At executive conference of National Association of Hosiery and Underwear Manufacturers, in New York, constructive program of action is formulated. (Oct. 26-27.)

Paolino Gerli, president of Silk Association, in address at hosiery conference warns of gravity of Japanese silk situation, involving probable government control of production and prices. (Oct. 27.)

Textile Foundation sponsors marketing study in silk and rayon goods, similar to those previously undertaken in cotton goods and in wool goods. New enterprise to be conducted by Silk and Rayon Research Bureau, headed by Ramsay Peugnet.

October rayon production in this country estimated at 100% of capacity, as compared with 90% in September.

Plans for first annual Knitwear Industrial Exposition, to be held in New York, week of Feb. 13, announced by National Knitted Outerwear Association.

## *NOVEMBER*

Serious threat to textile industry seen in proposed domestic allotment plan of farm relief.

Cooperation of many textile organizations voiced at annual meeting of U. S. Institute for Textile Research. (Nov. 3.)

Crisis in maintenance of policy of elimination of night employment of women and minors, due to breakdown in print cloth and narrow sheetings groups, met at meeting of directors of Cotton-Textile Institute in Spartanburg, at which belief in policy was re-affirmed but responsibility decentralized, and placed upon individual groups. (Nov. 15.)

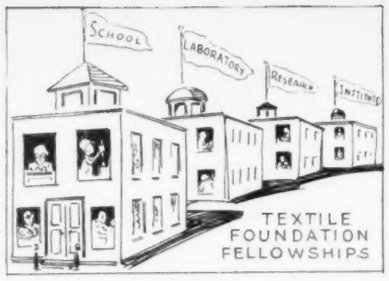
Plans for orderly liquidation of Hunter Mfg. & Commission Co., formation of new company to sell product of mills previously represented by Hunter, and selection of Howard E. Coffin, outstanding automotive and aeronautical leader, as chairman of new company, regarded as stabilizing influence in cotton goods market. New firm later named Southeastern Cottons, Inc.; Frederick Huff Payne named president.

Advisory Committee of the Wool Industry should "remain advisory," declares report of Committee on Scope at meeting in New York. (Nov. 15.)

Moratorium on restrictive labor laws of Massachusetts, to meet competition of other textile States, proposed by Gov. Ely and Henry P. Kendall at New England Council meeting. (Nov. 17-18.)

Chas. A. Cannon elected president of Cotton Manufacturers Association of North Carolina, succeeding Kemp P. Lewis. (Nov. 18.)

Shirting Fabrics Association merges with Textile Converters Association, becoming a division of the latter. (Nov. 18.)




Print cloth manufacturers form separate association, not connected with any existing organization, at meeting in Greenville. W. D. Anderson elected chairman; W. P. Jacobs, secretary. (Nov. 29.)

H. M. Ashby elected president of Wool Blanket Manufacturers Association, succeeding Thurmond Chatham.

## *DECEMBER*

Dr. Robert E. Rose elected president of American Association of Textile Chemists and Colorists at annual meeting in Greensboro, succeeding P. J. Wood. (Dec. 3-4.)

Further advance in textile-machinery improvement noted in progress report submitted at annual meeting of Textile Division, American Society of Mechanical Engineers. (Dec. 7.)

Government estimates cotton crop, as of Dec. 1, at 12,727,000 bales, a gain of 780,000 bales over Nov. 1 estimate. (Dec. 8.)

Domestic allotment plan of farm relief, involving excise tax on processors of cotton, silk and rayon, arouses wide-spread opposition in industry. Year ends with fate of this type of legislation in doubt.

Survey shows that non-run hosiery, meeting good initial acceptance, offers big trade-up opportunity.

Plans developing in industry to insure protection against piracy of designs, are summarized at meeting in New York. Passage of bill, pending in Congress, promising a measure of such protection, is predicted.

Silk Association rounds out service to industry by setting up a clearing-house for fashion information.

Resolution to allot 329,000 additional bales of Farm Board Cotton to Red Cross passed by both houses of Congress at end of year is in conference committee.

Textile Converters' Association changes name to Textile Fabrics Association, as another step in its expansion program.

Effective date of new part-wool blanket labeling standards postponed three months, to April 1.

Silk Association authorizes appointment of committee to consider question of elimination of night work in silk mills.

Slater Co., Inc., announces it will attempt to stabilize printing prices by reducing process work for which a reasonable profit cannot be obtained.

Total textile mill activity in 1932, based on raw material consumption, estimated by TEXTILE WORLD at 10% below 1931 and 19% below eight-year average 1924-1931.